ALSO IN OUR NEWS SECTION
- Siebel vows to make its software less of a pain. **PAGE 7**
- Storage Networking World preview: Managing multivendor SANs. **PAGE 14**

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COMPUTERWORLD

Web Services ROI Remains Tough to Prove

Tight budgets and management skepticism challenge IT managers trying to show payback

BY THOMAS HOFFMAN
NEW YORK

With Web services technology still in its infancy, a disconcerting trend is emerging: Cost-justifying projects to senior management is proving to be a difficult task as many IT managers struggle to find effective and consistent approaches to quantifying potential payback.

That was a key message de- livered by attendees at a Web services conference here last week sponsored by the Software & Information Industry Association, a Washington-based trade group.

But early adopters and industry participants said one way to help prove the value of Web services efforts is to develop "lightweight" pilot projects that quickly demonstrate

Web Services, page 16

Telcos Look to Corporate IT

Sector sees business users as best hope for stemming big losses

BY PATRICK THIBODEAU
WASHINGTON

The top-tier telecommunications providers are placing an increasingly strong emphasis on wooing corporate IT, which they see as their best hope for improving the embattled sector's bottom line.

But while some cor- porate users say their business needs are indeed being better addressed by the providers, that's not stopping them from taking steps to protect themselves from telecom business failures.

The telecom sector's greater emphasis on corporate IT is evidenced by the companies' recent financial results, as well as statements of future direction.

Although AT&T Corp. last week re-

Telecom, page 52

INSIDE:
WorldCom takes some more heat.
.PAGE 52

Net's Vulnerability Exposed

Attack on root servers resulted in moderate damage — this time

BY JAIKUMAR VIJAYAN AND PATRICK THIBODEAU

Last week's assault on the Internet's core addressing system may not have caused much real damage, but it highlights the Internet's vulnerability to more sophisticated cyberattacks in the future, security analysts warned.

All 13 of the Internet's root Domain Name System servers — three of which are located outside the U.S. — were victims of a massive distributed denial-of-service attack on Oct. 21.

"It was the single most elaborate and focused attack on the DNS network that we have ever seen," said Tom Ohlsson, vice president of Matrix Net-Systems Inc., an Austin, Texas-based Internet performance monitoring company.

The attack appears to have been an attempt to disrupt the Internet by clogging root DNS servers with useless traffic. The root DNS servers provide the vital translation services needed for converting a Web name such as *www. computerworld.com* into a corresponding numerical IP address.

But overall Internet service appears to have been largely unscathed, with few major disruptions reported, Ohlsson noted.

That's because most of the information contained in the 13 root DNS servers is cached in redundant and hierarchical

Vulnerability, page 16

LUCK Of the Draw

MORE THAN 9,000 OF YOU took part in *Computerworld*'s 16th Annual Salary Survey, which found that IT workers' salaries are holding up surprisingly well in the midst of the recession. But how well your company is getting along in this t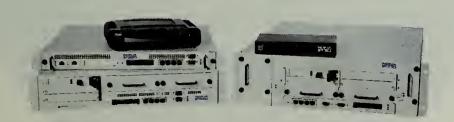eetering economy can make all the difference in how much you're getting paid. See what your IT peers will be taking home in salary and bonuses this year in our listing of compensation figures, which spans 30 job titles across a sampling of industries and regions. **PACKAGE STARTS ON PAGE 35.**

Connie Melnek and Shawn D. King say salaries are healthy at Bank One.
TED RICE

WHAT THEY EARN

CIO/VP of IT $151,278	**UP 7.2%**
Internet technology strategist $109,554	**UP 7.6%**
Help desk/technical support manager $71,417	**UP 5.3%**
Database analyst/ administrator $70,591	**UP 5.9%**

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QUICK STUDY

P3P
In the Technology section: A QuickStudy on the Platform for Privacy Preferences explains the voluntary protocol, which is designed to provide a way for Web users to automatically match their privacy preferences with Web providers' privacy policies. **Page 28**

Looking for Trouble
Also in the Technology section: KeyCorp's Carolyn Gardner, Robert Rickert and Jim Russ (left) created an application-level enterprise monitoring infrastructure that detects 60% to 70% of problems with customers' electronic transactions. **Page 23**

ONLINE
WWW.COMPUTERWORLD.COM

Foreign Workers' Real Appeal
KNOWLEDGE CENTER: WorkSoft Inc. CTO Linda Hayes struck a chord with many readers in her DevTalk column about the threat of offshore programming houses. Find the column, readers' comments and Hayes' responses at **QuickLink 33651**

Securing WANs
Consultant Richard C. Grosser outlines a step-by-step approach for building secure wireless networks. **QuickLink 33834**

KNOWLEDGE CENTER: Guest contributor Jerome A. Wendt, a senior SAN analyst, offers an overview of storage-area networks and discusses how to choose the right storage virtualization technology for the long term. **QuickLink 33642**

QuickPoll Results

Can large Wintel servers replace high-end Unix systems?

- No — 41.4%
- Yes — 16.6%
- Often — 8.5%
- Sometimes — 19.1%
- Occasionally — 14.4%

Take this week's QuickPoll at **www.computerworld.com**.
SOURCE: COMPUTERWORLD.COM NONSCIENTIFIC SURVEY; 946 VOTES

What's a QuickLink?
On some pages in this issue, you'll see a QuickLink code pointing to additional, related content on our Web site. Just enter that code into our QuickLink box, which you'll see at the top of each page on our site.

Sun Set to Ship New App Server

Sun Microsystems Inc. today will ship an application server software upgrade that adds support for Linux and versions of Unix other than its own Solaris operating system. Sun ONE Application Server 7.0 also includes new features such as a message queue and HTTP server plus a Web container for executing Java Server Pages and servlets. Sun said a full-function enterprise edition with clustering support is due to follow in March.

Storage Software Vendor Cuts Jobs

StorageNetworks Inc., a Waltham, Mass.-based vendor of storage management software, said it plans to lay off 80 of its 295 workers. The reduction is the third workforce cutback in the past 15 months at StorageNetworks, which lost $5 million in the third quarter.

HP Plans to Boost Itanium Support

Hewlett-Packard Co. officials said the vendor plans by early 2004 to double the processor count in its systems based on Intel Corp.'s 64-bit Itanium chips. HP is developing boards that will hold two Itanium processors, allowing users to put up to 128 CPUs in a server. The plan is designed to fill a gap while Intel develops Itaniums with two processor cores on a single chip.

New Web Services Standards in Works

The Billerica, Mass.-based Organization for the Advancement of Structured Information Standards said it has formed a technical committee to develop XML protocols that Web services applications can use to verify the validity of digital signatures. The protocols are also due to support time-stamping of signatures.

Java Coders Get New Version of Oracle Tool

Latest JDeveloper on par with tools from IBM, Borland

BY CAROL SLIWA

ORACLE CORP. this week plans to launch a new release of its JDeveloper tool, featuring support for the latest Java and Web services standards as well as commonly used open-source technologies.

Analysts said many of the enhancements will bring the tool up to par with the most recent offerings from vendors such as IBM and Scotts Valley, Calif.-based Borland Software Corp., which currently ship the most popular tools.

"Their issue has been convincing people this would be a viable tool even if I happen to target somebody else's application server or database," said Thomas Murphy, an analyst at Meta Group Inc.

John Meyer, an analyst at Giga Information Group Inc., said that although the new JDeveloper 9.0.3 release gives Oracle much of the standards support it needs, "it doesn't have the oomph yet that would propel it past the other major vendors' products." That added boost will come from the eventual tighter integration of frameworks that reduce the amount of code developers need to write, increasing their efficiency, he said.

User Sees Benefit

But James Holmes, an Atlanta-based independent consultant who has worked on Java projects for companies such as United Parcel Service Inc. and Royal Ahold NV, sees some benefit in the new release. He said he's looking forward to having built-in support for the open-source Struts Web application framework.

"It's a requisite for an IDE [integrated development environment] now," Holmes said. "If your IDE doesn't have it, it's lagging behind."

Other new features in JDeveloper 9.0.3 include support for Java 2 Enterprise Edition 1.3 and Enterprise JavaBeans 2.0, and a My JDeveloper extension manager that lets developers personalize the IDE with features they frequently use. In addition, the new version will allow developers to visually create Web services with a UML Class Modeler.

JDeveloper 9.0.3 is available for free download from the Oracle Technology Network (OTN). The cost to users deploying applications is $995.

Last week, Oracle also announced availability of the first version of its 9i Application Server TopLink object relational mapping tool for building Java applications with relational databases. Oracle acquired the tool in June from San Jose-based WebGain Inc., which sold off most of its technology this year.

TopLink is now available as a built-in feature of Oracle9i Application Server. Company officials also confirmed plans to support the tool for use with non-Oracle J2EE-compliant application servers, such as BEA Systems Inc.'s WebLogic and IBM's WebSphere.

A developer edition of TopLink can be downloaded for free from the OTN. The licensing cost is $7,000 per processor. ▶

Oracle Moves to Extend Supply Chain Capabilities

Upgrade will add collaborative tools

BY MARC L. SONGINI

Oracle Corp. next month plans to shore up its line of supply chain management applications with new collaborative tools as well as warehouse and transportation management capabilities.

The company last week said the supply chain features will be included in E-Business Suite 11i.8, an upgrade of its business applications that's due for general availability next month. The new release also includes portal-based reporting and data analysis tools for measuring supply chain performance, Oracle said.

The planned rollout is meant to help users get the most out of their existing supply chain assets while operating more efficiently and improving their decision-making capabilities, said Frank Prestipino, vice president of supply chain marketing at Oracle.

"It's a requisite for an IDE [integrated development envi-

Alcatel Internetworking Inc., a maker of telecommunications equipment in Calabasas, Calif., uses Oracle's 11i applications to manage its financial, manufacturing and supply chain planning operations. Allen Fox, IT director of applications at Alcatel, said a collaborative planning application that Oracle is adding as part of 11i.8 is of particular interest to him.

The collaborative software will give Alcatel a portal-

based view of its second-tier parts suppliers, according to Fox. That should "allow us to have complete visibility across the whole supply chain in a common format" so business managers can add or subtract suppliers and contract manufacturers for the company's products as the business demands, he explained.

But John Moore, an analyst at ARC Advisory Group Inc. in Dedham, Mass., noted that Oracle has yet to become a major player in supply chain management software. He said last week's announcement "remains thin on the details about how it plans to change that."

The market for supply chain software remains tough because of the limits many corporations have placed on IT spending, Moore said. He added that Oracle lags behind rival vendors of enterprise resource planning software, such as SAP AG and J.D. Edwards & Co., in terms of supply chain market presence.

But Prestipino said about 10,000 of Oracle's 13,000 application customers use some sort of supply chain software developed by the company. "Our visibility is increasing all the time," he said. ▶

Siebel Promises Easier Integration, Simpler Software

New XML-based system due in '03

BY MARC L. SONGINI
LOS ANGELES

Trying to rebound from a sales decline that helped put it in the red in the third quarter, Siebel Systems Inc. is promising to slash integration costs related to its customer relationship management (CRM) software and simplify the applications for end users.

At the Siebel Worldwide User Week 2002 conference here last week, the company announced that it has started beta-testing the first release of its Universal Application Network (UAN) integration technology and will ship the product this quarter. UAN is designed to make it easier for companies to connect Siebel's software to homegrown systems and packaged applications sold by other vendors.

Siebel CEO Thomas Siebel said UAN, which is based on XML and Web services technologies, should reduce the number of individual connections that are needed between applications. The UAN software lets users create templates for entire business processes, Siebel said. For example, it could be used to coordinate customer address changes and other CRM tasks that span multiple systems.

San Mateo, Calif.-based Siebel also announced a technology-sharing and joint sales partnership with Microsoft Corp. Among other things, the deal will tie UAN to Microsoft's BizTalk Server software and Visual Studio .Net design tools (see story below).

In his keynote speech, meanwhile, Siebel acknowledged the "mind-numbing" complexity of the company's software and assured attendees that it will work to "dramatically simplify the presentation to the end user" during the next few years. He didn't disclose specific plans.

The various moves came just a week after Siebel announced a $92 million loss for the third quarter. But Siebel told the audience that the software vendor is "financially rock solid," with $2 billion in cash on hand.

Timothy Plzak, vice president of enterprise technologies at Safelite Glass Corp. in Columbus, Ohio, said UAN will play a key role as his company works to replace its mainframe-based call center and transaction applications with the new Siebel 7.5 release.

The Siebel system will run on Windows 2000 servers and is due to be phased in gradually starting early next year.

Plzak said Safelite, which operates retail auto glass and insurance claims processing businesses, will use UAN to move billing and invoicing data to a financial system based on Oracle Corp. applications.

Siebel's increased focus on integration should benefit users, said John Hood, CIO at Key Energy Services Inc. in Midland, Texas. As long as Siebel supports interoperability with technologies like Microsoft .Net and Java 2 Enterprise Edition, "it will make it easier to interface with other applications we might have or, more importantly, systems our customer might have," Hood said.

Key Energy, which provides support services to oil companies, plans to go live with the field service modules of Siebel 7.5 next summer, replacing a mix of disparate systems.

Erin Kinikin, an analyst at Giga Information Group Inc. in Cambridge, Mass., said Siebel has convinced middleware vendors like Microsoft, IBM and BEA Systems Inc. to support UAN. But Siebel still needs to prove that it can deliver UAN-based applications that offer enough value to entice users, she added. ◗

TOUGH TALK

In an interview, Siebel CEO Thomas Siebel discusses the company's third-quarter loss, its rivals and ROI:

◗ **QuickLink 33892**
www.computerworld.com

Siebel, Microsoft Tighten Development Ties

Siebel executives said the agreement with Microsoft that was announced at last week's user conference will let Siebel's CRM applications more fully exploit various Microsoft products and .Net-related technologies.

The deal includes the formation of joint development teams that will certify the interoperability of Siebel and Microsoft products. They will also optimize Siebel's software for use with Windows, the SQL Server database and Microsoft's .Net framework.

According to Ed Abbo, senior vice president of technology at Siebel, benefits will include tighter integration with SQL Server and the ability to extract more data from Microsoft Office. IT workers will also be able to use Microsoft's tools to develop and run integration-oriented business processes based on Siebel's Universal Application Network technology, Abbo said.

Abbo noted that the deal won't affect Siebel's other middleware partnerships. The company quickly followed the announcement by reaffirming its support for Sun Microsystems Inc.'s Java technology.

The Siebel/Microsoft alliance should make it easier for Siebel applications to extract information from Microsoft's desktop products and use it in reports without the need for intermediary pieces of software, said Timothy Plzak, vice president of enterprise technologies at Safelite Glass.

But Joshua Greenbaum, an analyst at Enterprise Applications Consulting in Daly City, Calif., said the new agreement will probably have little impact on Siebel's bottom line. "What would be news is if Siebel wasn't supporting this platform," he said, referring to .Net.

– Marc L. Songini

Micro Focus, Microsoft Strike Cobol Deal

Developers gain new option for writing to .Net

BY CAROL SLIWA

Getting old or new Cobol applications to run in Microsoft Corp.'s .Net development environment should become a more realistic option now that the leading Cobol tools vendor has signed up for Microsoft's Visual Studio .Net integration partner program.

Micro Focus (U.S.) Inc. in Rockville, Md., today will announce a commitment to extend its Net Express tool, which allows Cobol developers to write applications for the Windows, Linux and Unix operating systems, to Microsoft's .Net environment.

"Micro Focus Cobol will become a first-class citizen in the .Net framework, in the way that C# or Visual Basic might be," said Tony Hill, CEO of Micro Focus. Hill said his company is making a "significant investment," which he declined to specify, because customers "are telling us that they see .Net as part of their future."

John Billman, Net Express product manager, said Micro Focus had to adapt its Cobol compiler to translate Cobol code into the Microsoft Intermediate Language that can be executed by the .Net framework's Common Language Runtime.

That effort will have two important consequences for developers. Users should be able to move all of their business logic written in Cobol and significant portions of their other Cobol code directly to the .Net environment without the need to rewrite the code, so long as they haven't targeted any special or proprietary application programming interfaces, Billman said.

Users will also gain access to the .Net framework's many new class libraries, including the Windows and Web forms that can be used to create user interfaces, said Dan Hay, a lead product manager in Microsoft's Visual Studio enterprise tools division.

Accordingly, users working inside Microsoft's Visual Studio .Net tool will be able to create an application project using Micro Focus Cobol or work with existing legacy code, Hay said.

An early-adopter program for .Net support in Net Express will start in December. The final version of the tool, which will sell for $3,700 per seat, is due next June.

Hay said Microsoft will likely work out an arrangement whereby Micro Focus can sell Visual Studio to its customers along with the Net Express product.

The Micro Focus product won't be the first tool targeting Cobol developers. Earlier this year, San Jose-based Fujitsu Software Corp. released its NetCobol for .Net tool, which also compiles Cobol code to run on Windows.

But Hay said Micro Focus supports a broader range of platforms and has a larger installed base than Fujitsu. ◗

Net Express

WHAT IS IT? Integrated development environment for extending Cobol apps to Windows, Linux and Unix operating systems.

WHAT'S NEW? Integration commitment for Visual Studio .Net development platform.

WHEN'S IT DUE? June 2003

BRIEFS

Novell Adds MySQL DB to NetWare 6

Novell Inc. said it plans to bundle a commercial version of the open-source MySQL database with its NetWare 6 software, starting in December. MySQL will also be included in the next release of NetWare, which is due by mid-2003. Novell said there will be no open-source requirements for users of the database, which is developed by Swedish vendor MySQL AB.

Microsoft Makes Buy for MapPoint

Microsoft Corp. agreed to buy Vicinity Corp., a Sunnyvale, Calif.-based vendor of software that lets companies provide directions and other location-based services to their customers. Microsoft said it will pay about $96 million for Vicinity, which will be merged into its MapPoint unit. The acquisition is expected to be completed in the first quarter next year.

CA Sees Q2 Loss, 5% Revenue Gain

Computer Associates International Inc. reported a $52 million net loss for its second quarter, which ended Sept. 30, as revenue increased 5% on a year-to-year basis to $772 million. Corporate users continue to buy software only on an as-needed basis, said CEO Sanjay Kumar. "Customers are focused on very tactical solutions," he noted.

Short Takes

HEWLETT-PACKARD CO. CEO Carly Fiorina said during a meeting with financial analysts that she expects only single-digit growth in IT spending next year. . . . **CISCO SYSTEMS INC.** said it has signed an agreement to buy Psionic Systems Inc., an Austin, Texas-based vendor of network security software, for up to $12 million worth of stock.

MARK HALL ▪ ON THE MARK

Commerce One Clings To Web Services . . .

. . . for a technology life raft while the company morphs along with e-business. Narry Singh, the newly ensconced senior vice president of marketing at Commerce One Operations Inc. in Pleasanton, Calif., recounts the various — some might say muddled — past lives of the company and **admits somewhat ruefully** that, again, "our current era is one of reinvention." A big part of the change inside and outside the company, he says, is a shift to Web services. Still, Singh doubts that offering a 100% Java Web services technology gives Commerce One

an advantage in the market. ("We say, 'It's **ROI, not UDDI.'** ") But the (now) Internet supply chain software provider has made a big bet on Web services with Conductor 6.0, which eats and breathes SOAP, WSDL and their ilk. Now in beta, the software will ship in February. The company's MarketSite users will have to wait for their migration tools until summer '03, when the 6.1 upgrade gets released. ▪ The **mother lode for Web services will be mainframes**, which is where Paul Roth, CTO at Tampa, Fla.-based CommerceQuest Inc., is digging with his company's Nov. 15 release of CICS Process Integrator (CPI) 7.0. The software, which turns any CICS resource into an available Web service, comes in two parts — the developer environment and a runtime engine. Interestingly, it uses the new open-source Eclipse developer framework, which

Roth says is pretty cool. CPI 7.0 runs on either OS/390 or zOS mainframes and will set you back $50k for starters. ▪ Next month's also when users of BMC Software Inc.'s Patrol Storage Management (PSM) 3.1 will get Patrol Storage Automation-Provisioning, which lets SAN admins set policies to offload routine tasks such as allocating more disk space to database tables. For now it works only with EMC and Hitachi drives, Brocade and McData switches, Windows 2000 and Solaris operating systems, and the Oracle database. PSM users with IBM and HP drives and AIX and HP-UX operating systems will have to wait for the next release in '03. DB2 and Sybase databases are also on BMC's to-do list. **Microsoft's SQL Server didn't make the cut.** ▪ An adviser on the President's Panel for Science and Technology, Kenneth Nwabueze, pre-

Holiday Items

Okena Inc. ships StormTrack 1.0 in December.
. . . .
Eiffel Software Inc. is readying a Linux version of EiffelStudio 5.2. Word is, it'll be free to non-pros.

dicts that by mid-to-late 2003 security experts will be able to locate the source for Internet attacks in near-real time. Even attacks that use proxy computers as go-between systems will get nailed by the new tools in development. While talking about new stuff, Nwabueze, who's CEO of SageMetrics Corp. in North Hollywood, Calif., also revealed that on Nov. 11 users of his company's Web analytic product, SageAnalyst Real Time, which went live today, will be able to tie it to a service from Digital Envoy in Norcross, Ga., so that Web site owners can instantly know the geographical location of their visitors. ▪ November is also when Keynote Systems Inc. in San Mateo, Calif., will offer Traffic Perspective 1.0, a new service that blends recorded Web site visitor information with synthetic test data to home in on performance problems from both angles in a single view. Speaking of views, the company is testing the waters for its MyKeynote Inside, which gives Web-site operators a real-time look at system performance metrics. Not unlike **management systems like HP OpenView. Without the software sticker shock.** Should be ready the first half of next year. ▪ Mobile-Wise Inc. in Los Altos, Calif., has tech-heads buzzing with its inelegantly, albeit accurately, named Wire-Free Electricity Base, a desk-blotter-like pad **that recharges mobile devices without cords.** You can even spill coffee on it. Pop an adapter into a laptop, PDA and cell phone, then simply set one or more of them on top of the pad to recharge the batteries. It won't be ready in high volume until Q1 '03, but it's a lock to become the alpha-exec's toy of choice. And it'll become an IT issue with an upcoming release that transfers and synchronizes data among recharging devices. **Bye-bye, Bluetooth.** ▶

XML-Packed Office 11 Goes Into Beta Testing

Designed with more focus on enterprise

BY MATT BERGER

The next release of Microsoft Office, intended to be a more corporate-focused version of the company's productivity application suite, has been delivered to a few thousand early beta testers, Microsoft Corp. said last week.

Code-named Office 11, the software is being designed to include wide support for XML, said David Jaffe, lead product manager for Office. For example, users will be able to save Word or Excel files in XML, which will allow the data inside those files to be shared with other applications that support the standard file format.

Word and Excel will also be able to retrieve XML data from any number of sources, including the Web and a company's internal data resources, he said.

One new feature being add-

ed to Office 11 that makes use of XML is called Smart Documents. It's a programmable task pane that can be customized to display information stored on the Web or on a company's internal network. Similar to the Smart Tags feature in Office XP, Smart Documents is context-sensitive, in that it will display data that's relevant to specific information inside a document.

SDK Coming

Microsoft will release a software development kit that enables developers to program the task pane to pull XML data from various sources, Jaffe said. A second beta version of

Office 11 will be available early next year and is expected to be distributed to a broader group of testers, he said.

Enabling Word and Excel to pull XML data from any back-end server that supports the standard file format could also relieve some antitrust concerns, said Ted Schadler, an analyst at Forrester Research Inc. in Cambridge, Mass. "By opening up the file format, they're heading off any claims of anticompetitive behavior," he said. "It's a huge risk for Microsoft, but I think the benefits are greater." ▶

Berger writes for the IDG News Service.

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NEWS

Palm Ups Ante in Handheld Market

New devices added as part of battle against Microsoft for corporate users

BY BOB BREWIN

THE BATTLE for the handheld computer market will ratchet up a notch today when Palm Inc. introduces a pair of devices aimed at corporate users.

Both of the new models being added to Palm's Tungsten product line offer larger color screens with more pixels and better resolution than competing hardware based on Microsoft Corp.'s Pocket PC operating system, said Barney Dewey, an analyst at Andrew Seybold's Outlook 4Mobility in Los Gatos, Calif.

But the Tungsten devices cost more than some Pocket PC handhelds, Dewey said. For example, Palm's Tungsten T model has a suggested list price of $499, compared with $299 for a Pocket PC handheld introduced last month by ViewSonic Corp. in Walnut, Calif.

Dewey predicted that Dell Computer Corp. will charge about $200 for the Pocket PC device that it's expected to introduce next month. A Dell spokesman declined to comment on the company's pricing plans.

The new devices being introduced by Milpitas, Calif.-based Palm also include built-in wireless capabilities. The Tungsten T offers Bluetooth short-range wireless technology for connecting to printers or wireless phones.

Bluetooth support is the exception rather than the rule in Pocket PC hardware. Only models from Hewlett-Packard Co. offer that feature, according to a Microsoft spokeswoman.

Palm said the Tungsten W is equipped with a Global System for Mobile Communications/General Packet Radio Service modem for connections to cellular wireless networks. The W model, which is priced at $549 and will initially be available only in Europe, also features a thumb-operated keyboard similar to the one used on Research In Motion Ltd.'s line of e-mail pagers.

Palm's Tungsten W

One Up on Pocket PCs?

Both of Palm's new Tungsten models support up to 16MB of memory and come with a 144-MHz processor made by Texas Instruments Inc. Older Palm devices used a 33-MHz Motorola Inc. chip. The hardware runs on the new Palm OS 5 operating system and includes third-party software designed to let users read Microsoft Office files.

David Christopher, senior director of product management for Palm's hardware group, claimed that feature gives the Tungsten devices an advantage over Pocket PC handhelds. "We actually do Microsoft better than Microsoft," he said.

Connell Smith, senior vice president of product marketing at Gearworks Inc., a mobile software developer in Eagan, Minn., said the sharper color screen, faster processor and built-in keyboard match the list of features he thinks Palm needs to add to stay competitive with Microsoft and its Pocket PC partners. ▶

Microsoft Ships Software for Mobile Phones

As Palm readied the introduction of its new Tungsten handhelds, Microsoft last week continued its push into the mobile computing market by releasing its Smartphone operating software for mobile phones.

London-based Orange SA disclosed plans to make available a Smartphone device on a mobile network in the U.K., starting this week. In addition, Redmond, Wash.-based AT&T Wireless Services Inc. said it plans to offer Smartphone-equipped handsets for use on its U.S. network by mid-2003.

The Smartphone software provides much of the functionality of Microsoft's Pocket PC operating system for handheld devices, minus support for Excel and PowerPoint. But it does so in a cell phone form factor.

Tim Bajarin, an analyst at Creative Strategies Inc. in Campbell, Calif., said the Smartphone technology could let mobile users carry just one device to handle all their data and voice communications needs. But, he added, vendors have yet to find "the killer design that makes these Smartphones a real hit."

Orange is offering its customers a device called the Orange SPV, a reference to sound, pictures and video. Many of the functions supported by the device can by synchronized with desktop PCs, the two companies said.

– Bob Brewin

GXS Launches E-Commerce Service for Paying Suppliers

Bill settlement process relies on B2B hub, XML

BY MATT HAMBLEN

General Electric Co.'s GE Transportation Systems unit expects to save nearly $1 million per year by using a new e-commerce settlement process that's due to be announced today by Global eXchange Services Inc. (GXS).

GE Transportation Systems started using the service with its maintenance, repair and operations suppliers in January and has seen a 75% reduction in the work needed for invoice reconciliation, said Ken Marshall, business leader for indirect sourcing at the Erie, Pa.-based division of GE.

On an annual basis, that should result in $900,000 in savings for processing about 100,000 invoices covering a total of $20 million in purchases from 4,000 suppliers, Marshall said. "They are clearly reducing our costs," he said of GXS. "I can't tell you the savings to our suppliers, but their reaction to the new system is, 'Where can I sign up?' "

The GXS service will be made available to other companies immediately. It uses Gaithersburg, Md.-based GXS's e-commerce trading hub and ePcard XML, an XML-based corporate purchasing card technology developed by GE Capital Financial Inc., another unit of GE.

Purchasing card tools, known as Pcards, haven't gained wide popularity in e-commerce applications because many corporate users are worried about the potential security problems raised by purchasers giving credit account numbers to their suppliers, according to analysts.

"I hear over and over again that businesses are nervous about putting financial information out on the Web," said Aaron McPherson, an analyst at IDC in Framingham, Mass.

But ePcard XML sidesteps the security worries by essentially giving suppliers a "pseudo-account number instead of the actual account number," McPherson said.

A purchase order is associated electronically with a unique account number and is also packaged with information such as preset percentage limits for shipping and incidental costs as well as limits on when the purchase order expires, he said.
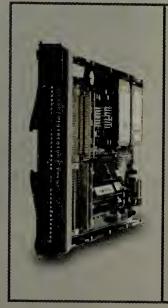
A Unique Service

"I think it's a really significant development in B2B payments," McPherson said, referring to business-to-business transactions. "I haven't heard of anybody else doing this." He added that the GXS system also matches purchase orders with data about products or services from different suppliers, making it easier for workers to buy goods that qualify for prenegotiated discounts.

GXS, a former GE unit that was spun off last month, said it will charge users of the settlement service a fee of $1.75 to $2.50 per transaction. Marshall said that's much less than the $15 to $50 it costs to manually process a purchase order. ▶

How It Works

1 **GE Transportation Services** submits a purchase order for supplies to GXS.

2 **GXS converts** purchase order to ePcard XML format and sends it to GE Card Services unit.

3 **An account number** and preauthorization for the transaction are returned to GXS.

4 **GXS converts** the transaction file to XML, EDI or fax for delivery to the chosen supplier.

5 **The supplier processes** a MasterCard transaction to receive payment.

6 **GE Card Services** forwards transaction settlement data to GE Transportation Services.

IBM Reaches Out to Smaller Users With New Mainframe

But analysts say cost of third-party software may limit its appeal for users

BY JAIKUMAR VIJAYAN

IBM LAST WEEK introduced an entry-level mainframe that it said gives lower-end users a chance to upgrade and run Linux applications alongside traditional workloads.

But the steep third-party software pricing associated with mainframe hardware upgrades makes it unlikely that many small users will find the scaled-down box all that appealing, analysts said.

In a move that builds on its efforts to make mainframe hardware more affordable,

IBM last week rolled out its z800 OE1 model, the smallest member of its z800 series.

The system comes standard with a 40 MIPS engine for running traditional mainframe workloads and a separate 185 MIPS partition for running Linux applications.

Colette Martin, an IBM product manager, said the new system offers users of small mainframes — those with less than 40 MIPS — a chance to upgrade their hardware while gaining the flexibility to run Linux applications.

Most of the users in this cat-

egory run older IBM mainframe operating systems such as VM, VSE and OS/390. Many have been stranded on their hardware for several years because of the prohibitive software fees involved in migrating to IBM's newer, very large mainframes, analysts said.

In fact, until the release of the z800 OE1 model last week, the smallest upgrade option available for small mainframe users was IBM's 60 MIPS Multiprise mainframe.

For such users, the z800 OE1 offers a new upgrade option, Martin said. "We have reduced the size of the box to allow customers to move those smaller workloads," she said. IBM is also offering its zSeries

entry-level licensing model, which will result in a 20% cost savings for companies running qualified IBM mainframe software on the new system.

Even so, the prospect of shelling out more money for third-party software is going to keep many users with small mainframe workloads right where they are, said Phil Payne, president of Isham Research in Cambridgeshire, England. "A vast majority of these users are in a relatively ossified situation," Payne said. "They haven't been able to grow for such a long time, they are stuck in old [third-party] software pricing groups" that make it too expensive for them to upgrade.

As a result, expect to see the new model being used more to run pure Linux applications by larger mainframe shops, said David Floyer, an analyst at IT Centrix Inc., a consultancy in Framingham, Mass.

The goal here would be to use the new mainframe models for running front-end Linux applications and linking them back to applications running on larger mainframes.

"A lot of people would be very happy to keep their Linux stuff separate from their mainframe applications," Floyer said. The new model appears to give them a way to do that while still taking advantage of traditional mainframe horsepower, he added. ▶

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Stratus Offers Guarantee On Fault-Tolerant Systems

Will pay $100K if hardware or OS crashes in a year

BY JAIKUMAR VIJAYAN

In a program aimed at boosting acceptance of its fault-tolerant Wintel-based systems, Stratus Computer Corp. last week said it will pay up to $100,000 in cash or product credit to Stratus users who experience unexpected hardware or operating system failures.

The Perfect Performance Program applies to users who run Microsoft Corp.'s Windows 2000 Advanced Server and purchase a top-of-the-line Stratus ft 6500 server with triple modular redundancy.

Users also need to buy Maynard, Mass.-based Stratus' business-critical services as part of the program. The guarantee applies only to failures within the first 12 months of the equipment purchase.

Even so, the move is a gutsy one for a small company that has been trying to expand the market for its Wintel fault-tolerant servers from its current narrow niche in areas such as emergency 911 services, analysts said.

"It shows they are willing to put their money where their mouth is," said Eric Rocco, an analyst at Gartner Inc. in Stamford, Conn.

The money-back guarantee is geared at attracting the attention of users looking to server clustering options to build high-availability Wintel configurations, said Gordon Haff, an analyst at Illuminata Inc. in Nashua, N.H.

The idea is to position Stratus' fault-tolerant technology as a viable option that doesn't require the complex scripting and administrative overhead involved in Wintel clustering, said Jim Gargan, a vice president at Stratus.

Viking Range Corp., a man-

ufacturer of cooking equipment in Greenwood, Miss., is considering purchasing a Stratus fault-tolerant system under the new program. The company is looking for a high-availability server to consolidate its corporate e-mail applications, said Shyam Ramachandran, IT manager at Viking.

"With these boxes, there is none of the [learning] or ongoing maintenance that is required with clustering," said Ramachandran.

But there are caveats.

Many of the problems that cause applications to crash aren't related to the hardware or operating system. So buying a triple-redundant server alone will do little to improve availability if the core applications themselves are poorly configured, according to Haff.

"The OS and the hardware are only part of the overall high-availability picture," Haff said.

Stratus claims that it has strengthened the overall reliability of the Windows operating environment by "hardening" the device drivers that cause most Windows crashes.

Even so, there is a limit to what the company can do as a hardware vendor to prevent Windows operating system crashes, Ramachandran said.
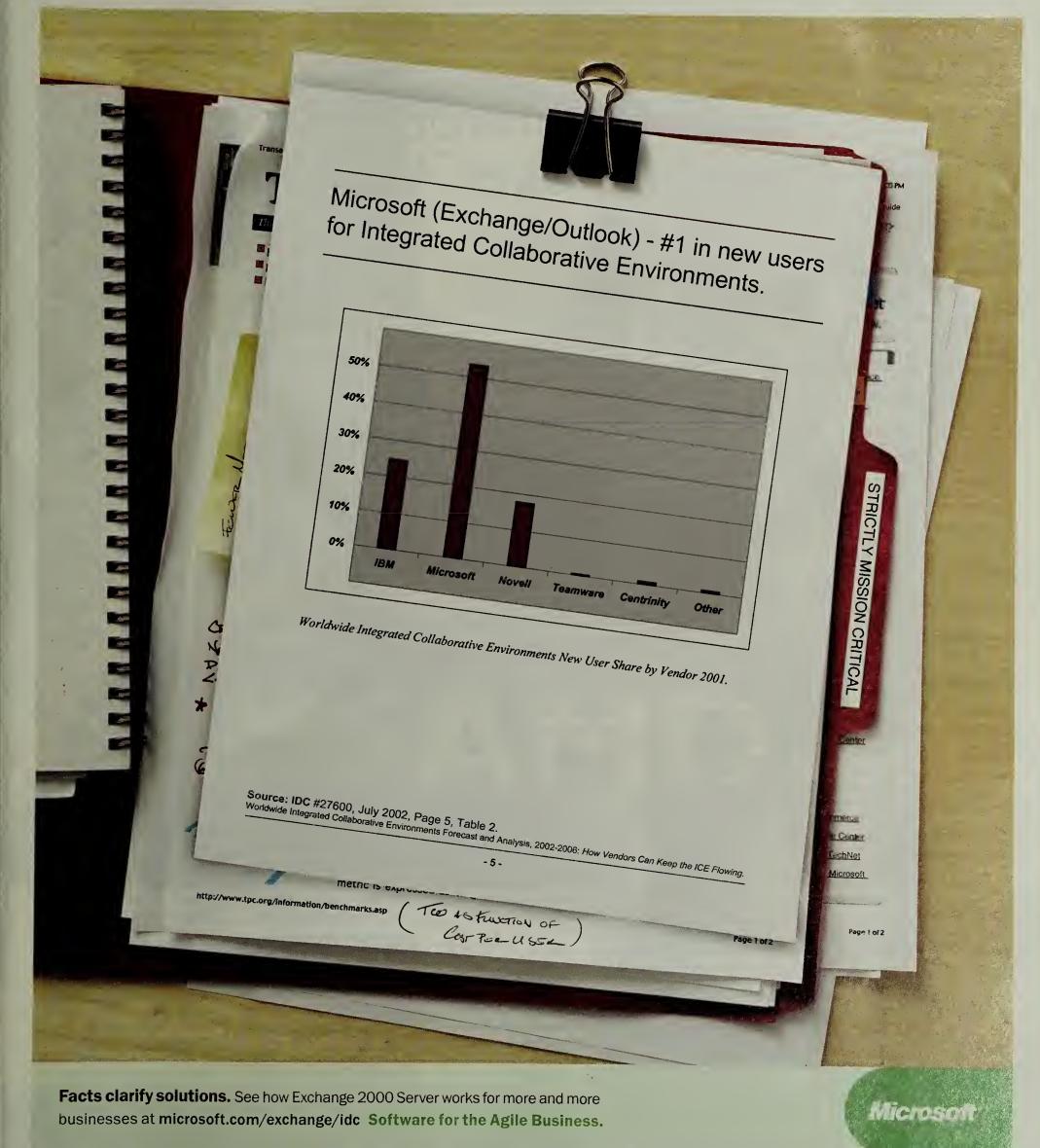
"If that goes down, we are down, and there's really not a whole lot Stratus can do," he said.

But the $100,000 money-back program is "nice insurance to have," Ramachandran said. "It should help keep them on their toes and make sure everything is in sync." ▶

Microsoft (Exchange/Outlook) - #1 in new users for Integrated Collaborative Environments.

Worldwide Integrated Collaborative Environments New User Share by Vendor 2001.

Source: IDC #27600, July 2002, Page 5, Table 2.
Worldwide Integrated Collaborative Environments Forecast and Analysis, 2002-2006: How Vendors Can Keep the ICE Flowing.

- 5 -

Facts clarify solutions. See how Exchange 2000 Server works for more and more businesses at **microsoft.com/exchange/idc** **Software for the Agile Business.**

Microsoft

Sun Offers Server Management Tool

Sun Microsystems Inc. introduced a systems management tool designed to automate the process of installing, upgrading and maintaining software on large groups of servers. The Sun Management Center Change Manager is part of the N1 management technology initiative Sun detailed last month [QuickLink 32872]. The tool is priced at $5,000, plus $250 for each server it manages.

Congress Grants Supply Chain Funds

Congress last week sent legislation to President Bush authorizing $47 million in funding for the National Institute of Standards and Technology (NIST) to develop supply chain IT standards. The bill comes after an NIST study found that the lack of such standards is costing the automotive industry $1 billion per year. The funding would be spread over four years.

Lucent, Avaya Report Q4 Losses

Murray Hill, N.J.-based Lucent Technologies Inc. posted its 10th straight quarterly loss, reporting a deficit of $2.81 billion for its fourth quarter, which ended Sept. 30. Revenue totaled $2.28 billion, down 56% from $5.16 billion a year earlier. Spin-off Avaya Inc. in Basking Ridge, N.J., also remained in the red, losing $534 million on revenue of $1.15 billion in its fourth quarter.

Short Takes

Plano, Texas-based ELECTRONIC DATA SYSTEMS CORP. said it signed a three-year deal to manage the Oracle financial applications and Siebel customer relationship management software used by Dallas-based i2 Technologies Inc. . . . SAP AG released an application that manages global trade logistics.

Common Storage Management Interface Takes Another Step

Vendors will use Bluefin standard to run multivendor SAN at conference

BY LUCAS MEARIAN

SIMPLIFYING the process of managing multivendor storage installations is a top priority for many IT managers, and technology vendors are starting to show how they plan to make that happen.

At this week's Storage Networking World conference in Orlando, a group of about 20 vendors will demonstrate a multivendor storage-area network (SAN) that is monitored and managed through a single open interface based on specifications being developed by the Storage Networking Industry Association (SNIA) in Mountain View, Calif.

Key storage vendors are also starting to announce plans for shipping products that support the interface, which originally was known as Bluefin and is now part of the Storage Management Initiative (SMI) that the SNIA launched when it took responsibility for completing the proposed standard in August [QuickLink 32013]. For instance, EMC Corp. in Hopkinton, Mass., last week said it plans to release SMI-enabled software development kits next year as part of its Wide-Sky storage management technology initiative.

The SMI effort includes the use of two related specifications: an object-oriented storage management framework called the Common Information Model (CIM), and Web-Based Enterprise Management, which defines an interface layer for sharing CIM data between products.

George Mele, director of software marketing at EMC, said CIM in particular will take pressure off software developers who now spend much of their time writing middleware interfaces to other vendors' storage products.

"The faster CIM gets adopted, the better it is for EMC, because we can start focusing on higher-level functions and let CIM take care of the housekeeping," Mele said.

Most of the leading storage vendors said they plan to offer SMI-compliant software and build support for the interface into their storage devices by next year. The multivendor demonstration at this week's conference, which is being jointly sponsored by the SNIA and *Computerworld*, will include companies such as EMC, IBM, Hewlett-Packard Co., Hitachi Data Systems Corp. and Network Appliance Inc.

Brad Stamas, chairman emeritus of the SNIA, said the current approach of relying on individual application programming interfaces (API) to exchange data between different devices on a SAN is both clumsy and arduous. "Using a proprietary API exchange doesn't really scale that well," Stamas said. "Users are faced today with picking a flavor, picking a vendor."

"HP doesn't believe API exchanges are a good position to be in long term," agreed Steve Jerman, storage management architect at the company. "It's just too difficult. Once more than two devices use [SMI], that's one less interface we have to deal with." ▶

Bluefin Developments

MAY: A group of 16 vendors submitted the proposed standard to the SNIA.

AUGUST: The trade group, which includes a total of about 300 companies, agreed to finalize the draft specification.

DECEMBER: The SNIA expects to submit the specification to the American National Standards Institute by year's end.

CIA's Venture Arm Has Eye on Storage Management Start-up

In-Q-Tel looking for technology to better control spy agency's SANs

BY LUCAS MEARIAN

The CIA's venture capital arm last week disclosed a funding and development deal with Candera Inc., a Silicon Valley start-up that's building technology for managing storage-area networks (SAN).

Arlington, Va.-based In-Q-Tel Inc. and Milpitas, Calif.-based Candera said they plan to jointly develop storage management software and hardware features to address performance and security issues within the CIA's SANs.

The deal calls for Candera's software, due to be commercially available early next year, to be enhanced so it can tie together disparate storage systems, perform load balancing, centralize storage administration and provide a more comprehensive understanding of storage allocation.

"One nice thing is that [Candera has] been able to architect their solution really from the ground up," said Eric Kaufmann, a vice president and partner at In-Q-Tel. "They went out and identified where the problems were with storage-area networks, and they were able to really develop a comprehensive product and address those pain points."

Kaufmann said another factor in choosing Candera was its development staff and management team, which includes former executives from vendors such as Cisco Systems Inc., EMC Corp., IBM and Hitachi Data Systems Corp.

In-Q-Tel is a nonprofit company that acts as a financing go-between for the CIA and technology vendors. Neither Kaufmann nor Sundi Sundaresh, Candera's president and CEO, would disclose any additional details about the deal, including the amount of money In-Q-Tel is investing in the 2-year-old company.

Nancy Marrone, an analyst at Enterprise Storage Group Inc. in Milford, Mass., said the biggest difference between Candera's storage management offerings and those of other vendors is that the start-up is also developing specialized hardware to boost performance and reliability.

Marrone said the only vendor that sells a "purpose-built" storage management appliance is Rhapsody Networks Inc. The Fremont, Calif.-based company has developed a line of switches that run storage management software. ▶

CANDERA FACTS

HISTORY: Founded in 2000 as Confluence Networks; renamed Candera last month

NUMBER OF EMPLOYEES: About 50

FUNDING: $45 million raised in two rounds of financing

PRODUCT STATUS: Still in development mode; shipments due early next year

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Vulnerability

fashion across multiple secondary DNS servers.

"On the plus side, this shows that despite all those apocalyptic projections, the Internet is more resilient than people think," said John Pescatore, an analyst at Gartner Inc. in Stamford, Conn. "But it also shows that the basic plumbing of the Internet still has vulnerabilities that need to be addressed or brought up to business-quality levels."

Simple Solution

The relatively simply nature of last week's DDOS attack is what made it easy for administrators to detect and choke off the offending traffic in a few hours, analysts said.

But service would have started degrading if the attack had been sustained long enough for the information contained in the secondary DNS caches to start expiring — a process that usually takes from a few hours to about two days, analysts added.

"This wasn't exactly the most sophisticated attack in the world," said Jerry Brady,

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SNAPSHOT

DNS Servers

■ Thirteen geographically distributed root name, or DNS, servers operated are by nine independent organizations.

■ Ten of the servers are located in the U.S.; the others are in Japan, Sweden and England.

■ The root name servers are operated by the U.S. military, commercial organizations, nonprofit organizations, Internet service providers, universities and research institutes.

SOURCE: ICANN, MARINA DEL REY, CALIF.

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chief technology officer at Guardent Inc., a security consultancy in Waltham, Mass. "But I've got to believe that this is going to inspire a lot more attacks like this in future."

In a DDOS attack, hackers typically break into and take over thousands of poorly protected networked computers — including those in homes — and use such "zombies" to send torrents of useless data at target servers or networks.

"It is the electronic equivalent of somehow getting 50,000 phones to dial 911 at the same time," said Mark D.

Rasch, former head of the U.S. Department of Justice's computer crimes unit.

The Internet Corporation for Assigned Names and Numbers (ICANN), the private group that's charged with ensuring the stability and security of the DNS, will discuss methods for improving DNS security at its annual meeting next week in Shanghai.

Among the fixes ICANN will be looking at is deploying the DNS Security protocol to improve data origin authentication, said Stephen Crocker, an Internet pioneer and computer scientist who heads the ICANN security committee.

The more daunting problem is improving the security of PCs sold without any security protections. "It's a public nuisance issue," Crocker said.

And DNS servers aren't the only component of core Internet infrastructure that can be taken down by such attacks, analysts say. For instance, an attack directed against a few well-selected Border Gateway Protocol routers — which are used to exchange routing information for the Internet — could cause large portions of traffic to be misdirected at will, said Ted Julian, president

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ICANN Security Chief Seeks DNS Improvements

WASHINGTON

Q&A

In an interview with *Computerworld*, Stephen Crocker, head of ICANN's security committee, outlined options for improving DNS security in the wake of last week's attack.

What are the lessons learned from this attack? We shouldn't say everything is fine and expect the system to survive indefinitely. There will be other attacks, and they'll be more sophisticated and they'll be more massive.

Where is improvement needed? The first is improving the core protocols and service for DNS, and second, tightening up the Internet

against DDOS attacks by having the Internet service providers impose some discipline and authentication on the hosts. In today's Internet, it's relatively easy for a host to lie about its address and send packets with misleading return addresses. It's possible to fix this.

As part of tightening up the basic DNS system, we need to deploy the DNS Security protocol [a security protocol intended to improve data origin authentication] and create a wider set of implementations of BIND [the Internet Software Consortium's Berkeley Internet Name Domain server software used for DNS].

– Patrick Thibodeau

MORE ONLINE

To read the full interview with Stephen Crocker, visit our Web site:

QuickLink 33886
www.computerworld.com

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of Arbor Networks Inc., a Lexington, Mass.-based vendor of DDOS prevention tools.

Last week's attacks "represent an important escalation

of these kinds of threats," Julian said. "DDOS is no longer being targeted at single Web sites, but at the entire Internet infrastructure." ▶

Web Services

the potential return on investment of larger initiatives.

"Find some pain and relieve it," said John Radko, chief architect of global technology operations at Global eXchange Services Inc., a Gaithersburg, Md.-based spin-off of General Electric Co. that provides electronic data interchange services to retailers and manufacturers.

Radko also suggested making a business case for a Web services project that can attack "an area of intense investment," such as a high-priced enterprise resource planning (ERP) system that isn't generating the expected returns.

Figures showing how a company could use Web services technology to improve

the ROI of an ERP project "are the types of numbers that executives watch," Radko said.

A shortage of best-practices guidelines for Web services projects is another reason why IT managers should consider going after bite-size implementations that can demonstrate solid returns, said David Pawloski, a product director at Flamenco Networks in Alpharetta, Ga. Flamenco sells networking technology for Web services applications.

Uphill Battle

Companies can set up Web services to interact with other applications and manage specific business processes (see box). But given current IT spending constraints, technology managers likely face an uphill battle in arguing the financial value of Web services projects to top brass, some attendees said. Complicating matters is an expectation that large corporate Web services initiatives will take three to

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Potential Uses For Web Services

Streamlining paper-intensive refinancing and mortgage closings. Web services could be used to execute business processes, such as identifying when one lender should pay off a loan to another.

Video on demand. Many cable TV operators use object request brokers, which are expensive to manage. Web services could replace them and synchronize content streaming, billing and payments.

Real-time demand and inventory management applications. Retailers could use Web services to notify manufacturers when products need to be replenished.

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five years to roll out.

James Adamczyk, chief technology architect at Accenture Ltd.'s global consulting unit for the financial services market, said a CEO who gets a proposal for a big Web services project may be skeptical because of what has happened with other highly touted technologies such as computer-aided software engineering (CASE) tools and e-commerce systems. "He'll probably say, 'I've heard this before with CASE tools. I've heard this with the Internet. I've heard this with object-oriented programming,'" Adamczyk said.

In addition, trying to measure the ROI of an internally focused Web services project is a lot different from trying to gauge the returns of initiatives that would have a direct impact on a company's customers or suppliers, said Bill Whyman,
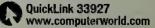
president of The Precursor Group, an investment research firm in Washington.

Would-be adopters face other challenges, including a lack of unifying standards. Some attendees also cited the immaturity of security and transaction support, as well as a shortage of experienced IT professionals with Web services skills.

"There are a lot of people out there who think they are [Web services] experts who don't know anything," said Brian Reed, vice president of market strategy at DataDirect Technologies Inc., a Rockville, Md.-based developer of data connectivity software. ▶

LOCKING HORNS

Vendors are butting heads in developing Web services standards. Read more at:

QuickLink 33927
www.computerworld.com

F5 Upgrade Focuses on IP Applications

BY MATT HAMBLEN

F5 Networks Inc. last week announced a new version of its server workload-balancing software, adding the ability to manage data for any IP-based application over a variety of advanced network protocols.

Analysts said the upgrade of F5's Big-IP technology is part of an emerging trend toward devices and software that use standards such as XML and Session Initiation Protocol (SIP) to move application traffic through networks.

After a two-month trial with Big-IP Version 4.5, Net2Phone Inc. plans to turn on the software "any day" to manage voice over IP (VOIP) traffic using SIP, said Jeff Skelton, chief technology officer at the Newark, N.J.-based company. The VOIP services provider handles millions of data-based voice calls globally every day.

Skelton said the move to Big-IP stems from a desire to use standardized protocols, including SIP. The new approach will replace a system based on tools from a variety of vendors, he added.

The Big-IP software, which runs on Seattle-based F5's line of IP application switches and appliances, inspects not only the header of an IP packet moving through a network, but also the payload. It then delivers the packet to the most available server for processing.

A single SIP session lasts for the duration of a phone call, which could be hours. "Looking at just the IP header is not enough for a SIP flow," Skelton said. "You have to look at the body of the payload to know which of the available application servers to route it to."

The new release takes F5 beyond load balancing of Web pages, a market that has become saturated, said Joel Conover, an analyst at Current Analysis Inc. in Sterling, Va. He said other vendors also offer software that can look at the payloads of IP packets, but "most don't have the horsepower to do multiple applications at once."

In addition, about 20 small companies are shipping or developing hardware that accelerates XML processing, said Greg Howard, an analyst at HTRC Group LLC in San Andreas, Calif. Those vendors include Sarvega Inc. in Burr Ridge, Ill., and DataPower Technology Inc. in Cambridge, Mass.

Conover said F5's software might match the XML switching speed of Sarvega's device within six months. But in its current state, Big-IP 4.5 has the advantage of understanding any network protocol and any IP application, he said.

F5 also announced three application switches, including a 24-port model. Prices range from $14,990 to $57,990. ▶

It can't enforce
correct posture.

PATRICIA KEEFE

Reward and Retain

I F EVER THERE WAS a time to pay heed to that time-honored maxim "Align IT strategy with corporate goals," this is it. Your future compensation, as well as the success of your company, is riding on it. Forget about how hot your skills are, how high on the org chart you sit or what industry or part of the country you work in; your own best interests are at stake. That's because *Computerworld*'s 16th Annual Salary Survey found a direct correlation between how well your employer is doing and how well you are compensated.

According to our survey of more than 9,000 IT professionals, which starts on page 35, the good news is that for the second year in a row, the majority of our respondents (60%) said their salaries jumped — this year, by an average of 6%. Not too shabby, considering that the average raise nationally was just 4%.

Obviously, companies still value IT. And that's a welcome ray of light in an otherwise darkened landscape.

However, the bad news is that bonus money has all but evaporated, driving down the overall impact of those raises. More sobering, your next increase in pay could be two years down the road. That's because, although optimists expect a modest recovery to kick off in the second quarter, pessimists say the recession could trash all of 2003, bleeding over into early 2004. Either way, the highflying '90s are long gone, and the focus has shifted to revenue generation.

Hence, IT budget increases in '03 are expected to go toward projects — not salaries, and by no means more hires. But currently employed IT workers should expect to keep their jobs. Most companies have winnowed down as far as they can.

PATRICIA KEEFE is a *Computerworld* editor at large. You can contact her at patricia_keefe@computerworld.com.

Indeed, noted Cutter Consortium analyst Tom DeMarco in a September report, "The temptation to cut IT personnel now is fatal." He urged managers to "protect your people as you would ... your vital organs."

That might explain those seemingly incongruous above-average pay raises. After cutting staffing to the bone, IT managers wisely decided to reward key workers. But money isn't the only currency. A quick look at the top five benefits our survey-takers said they're looking for makes it clear that the one thing they value most is *time*. Flexibility runs a close second.

Fortunately, these nonmonetary perks are well within the reach of IT management. Most observers argue that management needs to keep the remaining, and presumably best, employees happy so they don't leave once the economy turns around. But the short-term ROI is just as key: showing your hard-working staff appreciation and motivating them to keep on giving it their all under heavy workloads. Giving people more time off when you're already shorthanded is tricky, but you have to find a way to do it. People work harder, and smarter, when they can take an occasional break.

Keeping staff challenged is another reward, and it's also what our survey found is most likely to lure away IT workers. Whether through increased responsibility, project ownership or the chance to learn new technologies or get cross-training in another area, high-tech workers thrive on new challenges. So you need to find ways to provide them.

As we head into another year of fiscal uncertainty, IT managers will find themselves faced with two complementary goals: keeping their remaining staff engaged and motivated, and contributing to the corporate bottom line. You can't have one without the other, and you don't need to spend a lot of money to do either. ▶

"THE GOOD NEWS IS YOU'RE GETTING A RAISE."

PIMM FOX

Seek CRM Via ASPs

A CONSTANT DEBATE rages among those who favor "best-of-breed" applications and those who turn to integrated applications to solve business problems. Maybe it's time to kiss and make up.

The emergence of application service provider-configured accounting tools from NetLedger, Oracle's small business division, combined with CRM and ERP packages, makes it possible to view best of breed *as* an integrated package.

Compared with a typical accounting package that has to be integrated into a stand-alone CRM or ERP application, such as Great Plains from Microsoft, a Web-based application possesses advantages in terms of price, functions and maintenance. Rather than a silo of high-priced applications (Great Plains can run about $43,000 for four users, plus maintenance fees of an additional 18% per year) and integration costs, ASP solutions can be as little as $6,000 per year. In addition, because the ASP model runs off of one database, integration issues are less complex.

PIMM FOX is a freelance writer in San Francisco. Contact him at pimmfox@pacbell.net

Great Plains (of which there are several versions) is built on an Exchange database, while Microsoft's CRM offering uses Outlook — so you're still left passing data between multiple data stores in a non-Web native environment.

Web applications are more reliable for online use than applications that have been tweaked for Internet access.

ASPs were once seen as aimed primarily at small businesses (such as the office that wants to move up from Intuit's QuickBooks), but the midmarket is beginning to appreciate their allure and simplicity for both back-office and front-end applications. A difficult economic climate also means the end of expensive consulting contracts — and the demise of custom solutions.

Clearly, the ability to exchange data among sales, marketing and accounting departments while linking with in-

White Paper

October 28, 2002

SNIA SSF: Ensuring that Vendors and their Products "Play Nice Together"

COMPUTERWORLD

SNIA Supported Solutions Forum:
Ensuring that Vendors and their Products
"Play Nice Together"

Networked storage has grown rapidly in the last several years; there are now over 400 vendors in the field. SAN users still face challenges in selecting interoperable products with which to build multi-vendor SANs. Will vendors (and their products) learn to "play nice together"?

The SNIA Supported Solutions Forum offers the promise of a vendor-neutral, yet vendor-knowledgeable organization that can ensure vendor cooperation and drive supportable multi-vendor solutions that meet enterprise users' real-world needs.

SNIA

October 28, 2002

Dear IT Professional:

On behalf of the 34 member companies of the SNIA Supported Solutions Forum (SSF), I am pleased to endorse this White Paper on surviving in the complex multi-vendor world of networked storage. Now in our second year, we at the SSF have established an organization consisting of representatives from the leading networked storage vendors, all working together to ensure cooperation in helping users build successful and well-supported solutions.

We are excited about our new focus on user involvement and look forward to learning more about what users need from the SSF. This White Paper will share some of the input we have received on how we can help you. It will also provide you with an introduction to the needs we are attempting to address, the goals of the SSF, a bit of history, and a look to the future.

We are pleased to be participating in the Storage Networking World conference and invite those of you attending to visit our sessions and demonstrations. I'd like to thank our members for their support in moving the SSF mission forward. Particular thanks to those member companies who helped to underwrite this White Paper by advertising in it. Please consider our SSF members for your storage solutions, and let us all know how the SSF can better serve your needs.

Sincerely,

Phil Mills,
Chair of the SNIA Supported Solutions Forum

Input Needed:
What Users Want from SSF

The SNIA Supported Solutions Forum (SSF) was formally announced in June 2001. Its stated mission was to encourage competing vendors to work together in order to help users build and support SAN solutions, with choices of interoperable products. Its focus to date has been twofold:

● Developing a process to test, approve and register solutions.

● Creating a support community in which storage-related vendors work together to support users without finger-pointing.

As the SSF moves forward in its second year, having approved and registered a series of solutions based on the ideas of its members, the group is seeking to become a more user-driven organization. User involvement is a critical tool in understanding where the big problems are, what solutions will be valuable to test and approve, and what criteria are essential for their success. As part of their efforts to understand what users really want from the SSF, member companies have recently taken several steps, including creating a Customer Advisory Council; revising the SSF Web site to solicit user opinion; and conducting a series of user interviews. The initial results of these measures offer insight into both the need for an organization like the SSF, and what the forum must do to succeed.

User Profiles

Understanding the profiles of networked storage users is a critical step in understanding what they really need. Users are not just the Fortune 1,000; there are many medium-sized enterprises moving into various flavors of networked storage. Within each enterprise, there is often no clear owner of the networked storage strategy. Planning and decisions involve people from the networking, storage and data-management groups. Most users are concerned about buying from multiple vendors, but often believe they can't get the solution they need from a single vendor — and so are forced to deal with multi-vendor interoperability problems. They typically have long-term, trusting relationships with a number of vendors in this space, along with value-added resellers and system integrators.

Given today's economy, most users are constrained by money, human resources and time. And because their networked storage implementations usually include mission-critical information with 24-by-7 availability requirements, they seek assurance that their plans will work. They are most comfortable with household name vendors and successful industry track records, but will consider alternatives if the benefits of those alternatives can be proven. Most will consider, albeit reluctantly, migrating to another brand.

User Needs

When users are asked what they need from the industry in order to succeed, several clear themes become apparent. Given the multi-vendor nature of networked storage, many of their answers revolve around the issue of vendor cooperation. Also, users are looking for unbiased resources to help them wade through complexities in design, implementation and management. They say they need an information source that is vendor-neutral, yet vendor-knowledgeable, providing a knowledgebase that includes information on workable solutions as well as best practices. They need guidance and direction in creating their storage infrastructure.

Many users care about support for standards, but only as a means toward interoperability and future compatibility. In many cases, while they're more comfortable with

User Input

known brands, what they say they need most is tested and proven interoperable solutions — with a single point of support, rather than fingerpointing. As Mary Baum of Baum, Arensmeier and Talent Inc. — a strategic marketing firm working with the SSF and responsible for much of the group's customer research — says, "What users want is the networked storage Good Housekeeping Seal of Approval, for both the solutions and the cooperation commitment of the vendors."

User Requirements for SSF Success

The SSF is likely to be the organization that can best address these types of issues. What, then, will it take for the SSF to truly succeed?

The biggest challenge for the SSF comes from the fact that it consists of representatives of competing companies. While everyone talks a good game of interoperability, every vendor has a vested interest in its own success. For the SSF to succeed in meeting users' needs, SSF members must take off their vendor hats and work together to deliver a wide variety of multi-vendor solutions, complete with unbiased information. Solutions must address multi-vendor issues, with many choices for interoperable components. In addition, SSF member companies must demonstrate their commitment to user support, eliminating the notorious fingerpointing that occurs in multi-vendor situations.

One clear message from users is that there's a resource gap that could be filled, at least in part, by the SSF. Users want information in a variety of forms. They need to understand how to assess their needs, what their options are, what product combinations will or won't work together, and what the ramifications of those choices may be. They need hands-on experience and testing, but don't have the resources to build out environments for testing and comparison. If the SSF can provide a reasonable alternative to in-house learning and testing, it can help fill that resource gap. If the forum can provide a vendor-neutral resource for understanding integration issues, it can both fill the gap and shorten the implementation cycle. Success in filling this gap will clearly send users to the SSF for help.

Users are also looking for unbiased evaluations of vendors and products, and unbiased recommendations with an eye to the future. This is more difficult for a vendor-based organization. One way the SSF can help is to publish information on what doesn't work as well as what does.

If the only information published is positive results, the SSF will be viewed as just another marketing vehicle for vendors. The SSF is taking this to heart. Overall, while users can look to the SSF for information on what works and what doesn't, and potentially on how that will change in the future, for now, at least, they will probably still need to look to industry analysts for unbiased vendor analysis.

The most consistent message from users is the need for the SSF to show a strong commitment to multi-vendor solutions, and to deliver on that commitment. Delivery means users want more approved solutions based on real-world, complex needs with more interoperable product choices. As more approved solutions are available, users can look for those that match their environments and requirements and eliminate much of the groundwork they must do today.

Delivering on their commitment to multi-vendor solutions includes multi-vendor support. Success with the SSF support community will be a critical factor for users. The reality of multi-vendor solutions for many users has been a nightmare of blame and lack of cooperation. A support community in which vendors agree up front to work together, and in fact have already resolved many issues through registered solutions, will provide the kind of support users need to succeed.

Interestingly, much of what users want is either there today from the SSF or in the plans, but many users don't understand what the SSF is or how it can help. Some users know it exists, but don't know what it does. Others don't know how to approach the organization to ask for help. If the SSF is to succeed, it must help users understand what the SSF is, what it can do for users, and how users can benefit directly from its efforts.

— *Barb Goldworm*

> **For the SSF to succeed, members must take off their vendor hats and work together to deliver solutions**

SNIA Supported Solutions Forum:

Meeting Real World Needs

The State of the Industry

Networked storage has seen tremendous growth in the past several years, due largely to its promises of lower total cost of ownership and improved return on investment. Specific benefits include cost reduction through consolidation, better utilization of storage resources, improved manageability, increased availability and potential performance improvements for both storage and networking. The move to networked storage is in full swing.

In its early stages several years ago, storage-area networks were hot; it seemed every storage-related vendor jumped into the SAN fray. Lots of products were announced, and vendors began implementing various flavors of Fibre Channel products even before all the standards were completed. (In fact, the standards are still evolving.) Over the past few years, the SAN space has grown from a handful of vendors to more than 400.

By Barb Goldworm, Independent Consultant

Overall, this growth in numbers has been a very positive thing. Networked storage is a complex area, with a long list of user requirements in features, functions and configurations. In order to meet these needs, users need choices in vendors, products and technologies.

However, the large number of vendors and products has given rise to its own set of challenges. SANs by their nature involve a large number of components (servers, host bus adapters, or HBAs, hubs, switches, directors, storage adapters, arrays, tape libraries, backup software, storage management software, storage network management software and more) from a large number of vendors. Interoperability among these components and vendors is critical.

Interoperability

In many ways, the early days of SANs were reminiscent of the early days of local-area networks. Products started shipping from a variety of vendors, with many of them not talking to each other. Early SAN users faced significant challenges in selecting and implementing interoperable products to build SAN solutions. Many found the only way to succeed was to pick a primary vendor (typically either server or storage) and have that vendor build the SAN – using mostly its own products.

Over the next few years, a great deal of work was done by a variety of organizations to expand the functions included in the standards for Fibre Channel SANs. In addition to testing for compliance with standards, the industry as a whole has invested in various types of interoperability testing. Individual hardware and software vendors do some interoperability testing in their own labs,

which vary from a few hardware devices to multi-million dollar setups.

Manageability

Hardware interoperability has made great strides and is no longer a major barrier to networked storage. Software still offers challenges, both in firmware and in storage applications themselves, though firmware is also improving significantly through such measures as the HBA API. Standards efforts continue to move up the stack, with work on the Common Information Model (CIM) and Management Information Blocks (MIBs) progressing to help in managing networked storage devices.

Manageability of an interoperable, heterogeneous, multi-vendor environment has serious financial ramifications for users of networked storage. Diagnosing problems in this type of environment is extremely complex and time-consuming, particularly without the proper tools and support. Minimizing time spent in researching and addressing interoperability issues can help reduce both implementation and ongoing management costs.

Support

Even with products that are in compliance with standards, and even with good management tools, a multi-vendor environment can be a nightmare for a user without strong vendor support. While the technical aspect of a problem may have an easy solution, without cooperation from vendors, that solution may not be possi-

ble. Even if two products have been tested together in a lab, a variation caused by a third vendor can be a showstopper unless all the vendors work together.
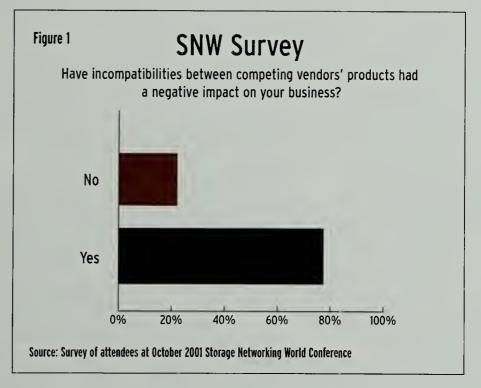
Users Want Help

It's clear that networked storage has made great progress in standards and component-level interoperability testing. Vendors have worked together in both these areas and are beginning to address software, manageability and broader vendor cooperation issues. Given this progress, it's significant that a survey of users last October showed that 79% of those surveyed have been negatively

The Creation of the SSF

These real-world issues resulted in a call to action by a group of networked storage leaders. In December 2000, in an attempt to address SAN compatibility problems raised by a user, a meeting was called by a group of six storage networking vendors. This meeting resulted in a high level of commitment from all participants, with agreement to work together to plan, test and support various configurations.

In addition to solving that first customer problem, the group realized the larger need for cooperation and communication. Seeking to expand the concept and be open to the entire

Figure 1

SNW Survey

Have incompatibilities between competing vendors' products had a negative impact on your business?

Source: Survey of attendees at October 2001 Storage Networking World Conference

impacted by multi-vendor incompatibility problems. (See Figure 1). Clearly, users still need help building and managing real-world multi-vendor networked storage solutions.

industry, the group took the idea to the SNIA Board of Directors. (All participating companies were SNIA members.) The board quickly realized the value this type of effort could

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bring to customers and to the industry, and the idea of the SNIA Supported Solutions Forum (SSF) was born.

Simultaneously, there was a separate initiative within SNIA to look at Cooperative Support Agreements to encourage vendor cooperation after products were sold. Since these ideas were highly complementary, they were combined into one charter for the SSF. Following SNIA rules for creating a forum, an official charter was drafted.

Because work had already been done in the two areas discussed above, the official formation of the SSF included significant milestones of success, above and beyond the announcement of the forum. As the culmination of this early work, the initial announcement of the forum in June 2001 included the first two solutions as well as a draft of a Cooperative Support Agreement.

Mission, Charter and Goals

The creation of the SSF centered around a clear need that had not been met within the networked storage community. Much work had been done in the industry on standards definitions and was beginning to bear fruit, with vendors delivering standards-based products. Many vendors had begun testing component-level interoperability and offering a variety of tested SAN configurations. The missing piece was to turn individual components and configurations into open, heterogeneous and supported solutions. While SNIA was providing an opportunity for vendors to work together in many areas, there had been no focused effort to bring technologies together into solutions, other than trade show demonstrations.

In order to accomplish the goals set out in the SSF mission statement (see following page), several subgroups were created to build on the original efforts and help drive the key areas of work.

Interoperable Configurations Subgroup

All work focusing on the requirements, approval and registration of Supported Solutions is under the direction of the Interoperable Configurations Subgroup (ICS). Through work with customers, consultants and others, the ICS defines the criteria for configurations and functional behaviors that are needed for a registered solution. These criteria may also contain specifications for function-

al, operational and RAS (reliability, availability and serviceability) characteristics. These characteristics may evolve over time, allowing for changes in customer requirements and emerging technologies. The approval and registration of Supported Solutions is one of the core functions and benefits of the SSF.

Customer Advisory Council

As part of the original charter to collect and publish customer requirements for interoperable solutions, the SSF created a Customer Advisory Council (CAC) as an ICS subgroup. The CAC is tasked with identifying the real-world objectives for networked storage, while avoiding any vendor agendas. It draws its membership from storage administrators, architects and designers of heterogeneous, medium- to large-size SANs.

As part of the SSF's new emphasis on customer input, the CAC will take on a bigger role and will become a separate subgroup this year. The CAC presents a great opportunity for users to offer direct input to vendors.

Cooperative Support Subgroup

The Cooperative Support Subgroup (CSS) focuses on encouraging vendors to work together to provide the best possible support for customers. It's responsible for evaluating and monitoring the ways vendors are working together in support of their combined solutions. This has resulted in the creation of a cooperative support community open to all SSF members. CSS oversees that community and maintains an online database of participating vendors.

Supported Solutions Forum Mission Statement:

To encourage cooperation among competing vendors in a variety of ways in order to help users build and support SAN solutions with choices of interoperable products.

The official charter defines specific ways the SSF will accomplish this mission:

- Provide a forum to define, test and qualify interoperable configurations.
- Publish a registry of supported solutions.
- Establish a cooperative support community, with specified levels of commitment.
- Advocate for customers regarding interoperable solutions.

With the official formation of the SSF and its subgroups complete, the next steps involved creating an infrastructure to support ongoing efforts, along with a vehicle for gathering customer input.

Membership and Momentum

While the original concept of ICS came from a group of six vendors trying to solve a specific customer problem, the value of the SSF was immediately obvious. By the time of the announcement, there were more than 30 members of the SSF working

together on ICS and CSS objectives. Initial efforts focused on creating processes to define solutions and encourage vendor cooperation. In any multi-vendor organization, mobilizing a group of competitors to work toward a set of common objectives requires time, patience and finesse. The board and the membership have worked hard together to build an organizational infrastructure. This infrastructure was critical to facilitate an ongoing methodology for enabling registered solutions. With the membership aligned and the infrastructure in place in December 2001, the SSF was fully operational.

Review Board and Guidelines for Registered Solutions

SSF members are a variety of vendors representing all areas of networked storage. In order to create a vendor-neutral framework for solution approval, an Independent Review Board was established, both as a sounding board for conceptual approval and as the final review for approved solutions. The Review Board has representation from vendors of storage, servers, software, HBAs, Fibre Channel switches, directors and services.

In order to create an environment in which vendors have an equal opportunity to propose solutions to the SSF, the first infrastructure task was to establish guidelines for proposed solutions, including rules of engagement, and the definitions and criteria for submitted solutions.

Requirements for each solution include a white paper that describes the solution and the participating

products, a test plan with objectives and results, proof of cooperative support for all participating vendors and a Solution Submission Checklist that asks questions such as:

- Top strengths of the solution
- Customer business and/or IT problem addressed
- Kinds of applications supported
- Restrictions
- End-user sites currently in production

Once a solution is approved, it becomes part of the Solution Registry, available online to users. The registry includes the above information and any marketing information that has been submitted. As the registry grows, additional categorization will be introduced to make it easier for users to identify the solutions that meet their needs.

Solutions are designed so that users can deploy them in their entirety, or can choose only the components relevant to them.

Announced Solutions

In the initial announcement of the SSF, there were two supported solutions based on the work done by the original six vendors. The solutions focused on simple interoperability of multi-vendor storage and included four storage vendors and two switch vendors. The two versions were based on a Brocade fabric and a McDATA fabric, and included separate data zones for Compaq (now merged with HP), EMC, Hitachi Data Systems and IBM. While they did require the storage to be zoned separately, the solutions addressed the issues of firmware levels and were qualified based on interoperability testing of device login coexistence, stability during fabric build, failures and reconfiguration, failover of components, and end-to-end data checking. These solutions were a small but important first step.

Now that the SSF has defined its criteria for solutions and created the process for proposing solutions, more have been approved, with still more in the works. In December, a new solution was proposed and approved within a week. This solution was based on Brocade, Compaq, Emulex, IBM, JNI and QLogic, and focused on LAN-free backup for high-availability SANs. In January, another solution set

Building Intelligent Storage Networks

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was approved, this one based on HDS, IBM, INRANGE, StorageTek and VERITAS.

The most recently announced solution focuses on business continuance in a multi-vendor storage environment. This solution uses an INRANGE fabric and Sun Solaris and IBM AIX, and Windows 2000 shared servers. Business continuance is provided through a primary site for normal operations running DB2 and Oracle applications with a remote site for disaster recovery located 100 miles away, connected via INRANGE channel extenders. The solution also includes HDS and IBM disks in the same data zone. Functionality includes mirroring via HDS TrueCopy and IBM PPRC, multi-pathing through VERITAS DMP, tape backup from STK and/or IBM, and backup software functionality

through Tivoli Storage Manager or Legato Networker.

Today there are five additional solutions in progress, addressing such issues as multi-vendor disk/tape storage with NAS on a heterogeneous fabric; multi-vendor mid-range storage with remote mirroring for disaster recovery; data sharing in a multi-vendor SAN; and multi-vendor fabrics. The SSF anticipates three to four more approved solutions by year's end.

Additional information on all registered solutions can be found in the SSF Solutions Registry page at: www.snia.org/ssf.

Cooperative Support Agreements

Since efforts were under way to create a multi-vendor Cooperative Support Agreement (CSA) prior to the formation of the SSF CSS group, ongoing responsibility for progress in this area fell to the CSS. One of the criteria defined by the ICS for an approved solution was some type of CSA for all vendors within the solution. While bilateral CSAs had been a useful tool for vendors to define what they would commit to in terms of cooperative support, with multiple vendors and combinations of vendors, it quickly became obvious that they were not the most efficient solution.

CSS Support Community

Since virtually every SAN solution involves more than two vendors, multiple bilateral agreements would be required, making things more complicated than necessary. The CSS looked at the creation of a support community to simplify matters. To determine

the key criteria, input was gathered from technical support directors, critical situation managers, tech support project offices and development teams, as well as from post-mortems on situations that did not go well. It was quickly determined that an organization already existed, called TSANet (Technical Support Alliance Network) that met many of the defined criteria. TSANet had an established code of conduct, a process for call handling, and an existing worldwide membership of over 100 organizations.

About the SNIA

The Storage Networking Industry Association, or SNIA, was incorporated in December 1997 and is a registered 501-C6 non-profit trade association. Its members are dedicated to "ensuring that storage networks become complete and trusted solutions across the IT community." The SNIA works toward this goal by forming and sponsoring technical work groups, by producing (with its strategic partner Computerworld) the Storage Networking World Conference series, by building and maintaining a vendor-neutral Technology Center in Colorado Springs, and by promoting activities that expand the breadth and quality of the storage networking market.

For more information on SNIA and the SSF, go to www.snia.org. For information on the Customer Advisory Council, contact the CAC chairman at ssf-cac@snia.org.

Given the critical production requirements for networked storage, it was necessary to create an additional set of criteria unique to the SSF support community. Once this was done, the SSF Open Support Group was officially launched; the group is now fully operational.

Future Plans

The solutions announced over the last year have demonstrated an increase in the number of vendors participating in the solutions, as well as an increase in complexity. As more solutions were initiated, it became apparent that the amount of work required to build the necessary configurations was limiting progress. As a result, the SSF will now encourage members to use the SNIA Technology Center for validation and testing of future solutions. This will leverage the work of other SNIA groups, minimizing the work needed for testing each solution, facilitating the reconfiguration and testing of multiple similar solutions, and allowing customers to visit the Technology Center to see the latest approved solutions.

Future solutions will continue to be expanded in terms of configuration size, the level of component interoperability and the inclusion of additional SAN applications. More progress will likely come in terms of more permutations of more vendors, increased functionality, additional virtualization, end-user and database applications, and the inclusion of other technologies.

With a functioning infrastructure in place, the SSF is turning its attention to end-user input; a revamped

> **The SSF is in a position to move the industry forward by sharing vital information with users**

Web site and the CAC will play key roles here. SSF Chairman Phil Mills says, "The SSF is committed to understanding and serving the open SAN needs of customers. We're actively seeking customer input through our updated Web site and our CAC to guide our solutions development work. Customers who interact with the SSF will gain an increased understanding of interoperability issues based on the lessons we've learned."

User input in one area has already resulted in a new goal for the SSF. While users benefit from information on solutions that work, they have also asked for information on problems experienced with multi-vendor solutions and approaches that don't work, as well as any suggested workarounds. This type of information

should prove to be extremely helpful to users as they investigate and implement new solutions.

Conclusions

Clearly, the SSF is working to establish a customer-driven forum so that it can focus its solutions on real-world customer needs and requests. The SSF is also in a position to help move the industry forward by sharing information with users that simplifies their networked storage decision-making and implementation process. As one user put it, "What I need most is a knowledgebase with information on proven solutions and best practices." The SSF is working hard to meet that need. The SSF may be the most likely organization to provide a vendor-neutral, yet vendor-knowledgeable source of up-to-date information on what works and what doesn't work in multi-vendor networked storage.

As more solutions are qualified, it will become easier for users to make intelligent decisions based on proven solutions. As users start demanding that vendors participate in the SSF, the benefits to the user community will grow exponentially.✳

Barb Goldworm is an independent analyst and consultant with over 20 years' experience in the computer industry in systems and storage management, in various technical, marketing, industry analyst and senior management positions with IBM, StorageTek, Novell and several successful startup ventures. She has been a frequent speaker at industry conferences worldwide for over 10 years and was the creator and track chair for the Networld+Interop track on Networked Storage. She has been a regular columnist and contributor for various trade publications including Network World, Computerworld and Storage Networking World Online, as well as being frequently quoted in the press. Barb is also an instructor of SAN Solutions and Technologies classes through HGAI (www.hgai.com/) and chairs the Publishing Advisory Board for Computer Networking for Macmillan/Pearson Education/SAMS Publishing. Barb can be reached at barbgoldworm@earthlink.net.

Q&A: An interview with Phil Mills, Chair of SNIA's Supported Solutions Forum

While he can point to several major accomplishments, the new SSF chief seeks to make the group more user-focused — and to preach the gospel of interoperability to vendors

Phil Mills is the new chair of the SNIA Supported Solutions Forum (SSF). He is also a senior technical staff member in IBM's Storage Systems Group. Mills recently discussed his views, plans and goals for the SSF with Bruce Hoard, executive editor of Storage Networking World Online.

Q: What is the current status of the Supported Solutions Forum?

Mills: We are making some very good progress. We've delivered five solutions since we started the forum, and in fact the latest solution was delivered Aug. 28. There are another five solutions that I know of in progress, and I don't always know of all of the solutions that are being worked on. It's quite possible that we will have two or three of those solutions announced before the Storage Networking World conference [Oct. 27-30 in Orlando].

There's a lot of ongoing activity within the SSF, but certainly not as much as we would like. We're working hard on that. We firmly believe that in order for the SSF to be really successful, we need to be turning out solutions quicker. In addition, we need customers to come to us and tell

us which solutions mean the most to them so that we can do the most for those customers.

Q: Typically, when you say a solution, what do you mean?

Mills: When I say a solution, what I

> **"I tell SSF members we have to work together toward vendor-backed interoperability. That will remove the fear barrier from potential customers."**

mean is a configuration that the customer would like to deploy. Let me start by talking about the most recent solution, the one we announced Aug. 28.

This solution had multi-vendor disks, from IBM and Hitachi Data Systems, and multi-vendor tape, from

STK and IBM. It had INRANGE fabric and channel extenders. It had tape backup software from Legato and IBM, and Veritas software for multipathing. It had AIX, Sun and Windows servers, and Oracle and DB2. So when I talk about a solution, I'm talking about all of this that we made run.

We tested it, qualified it to the point where each of the participating companies is willing to stand up and say, "We'll support that for the customer. If any problems arise, we will cooperate among ourselves to support that solution and make the customer happy."

Q: At whose behest is any given solution developed?

Mills: Currently — and this is what we want to change — the way they're developed is that people like me and the other most active members of the SSF get together and try to figure out what is lacking in the marketplace. We know interoperability is a big concern for a lot of customers, and we try to figure out where it makes sense to try to fill the holes. We involve those companies that we think

would make that solution work.

An example of what I would like to see is for a customer like the Bank of America to come to us and say, "We've got Hitachi disks, STK tape, IBM servers and Veritas software, and we are having problems with this issue, so why don't you help us put this together and make it work?" That's the kind of input we would like. That way, we could get right to the heart of the customer's problems, rather than having to guess what the specific problems are and put solutions together that we think will solve them.

Q: What is the current status of the SSF Customer Advisory Council?

Mills: The Customer Advisory Council, or CAC, within the SSF – there's also another such council within the SNIA itself — is making a lot of good progress. I think back in March we initiated that effort. We had some organizational problems within SNIA and SSF because we wanted to make sure that what we did within the SSF didn't clash with what we were already doing in SNIA, so we held off until the SNIA CAC got going.

Now, we're at the point where we are going full speed ahead. We're going to make the CAC a full subgroup of the SSF, which will bring its stature up to the level of the Interoperable Configuration Subgroup, or ICS, and the Cooperative Support Subgroup, or CSS.

In addition, we've modified our Web site so that customers can come, look at the CAC section, and input questions that will get right to the

SSF board, including suggestions for solutions that they would like the SSF to work on. The upcoming Storage Networking World event is where we're going to really kick it off. We're going to have a breakfast and a panel discussion that is all organized by the CAC.

Q: What's the trick to making vendors work together?

Mills: The trick is to show them that working together is a win-win

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"I want to make the SSF a point at which customers and vendors alike will start their searches for understanding what works and what doesn't."

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situation for the vendors as well as for the customers. All the vendors know that the customers are asking for the pieces of equipment from different vendors to work together. What's tricky is convincing Vendor A that when he makes his equipment interoperate with Vendor B, the result will actually increase his bottom line.

The way I've been doing that is preaching the gospel that some potential customers today are not getting into storage networking because they're afraid that when they put the

equipment together, it simply will not work. I say we have to work together toward promoting vendor-backed interoperability. That's what's going to remove that fear barrier from the customers and motivate them to deploy equipment from different vendors.

Q: What are your personal goals as chair of the SSF?

Mills: First, I want to really bring the customer focus into play here, and have the customers feed us their requests. Second, I want to make the SSF a point at which customers and vendors alike will start their searches for understanding what works and what doesn't. I'd like them to be able to come to the SSF Web site and start their search there, knowing we will have links to all the vendors who are working together.

I also want the Web site to have solutions that have been registered. Another thing I want there is white papers showing what works and what doesn't work, because what doesn't work is just as important to the customer as what does.

I'd like the SSF to be an industry focal point for interoperability questions. I also want to increase the participation among SSF members. Right now, we have about 34 paid-up members, and of those, about half are pretty actively involved in putting solutions together. I would like to increase the total number of vendors, because I think that's clearly important to the storage networking marketplace, and I'd like to increase the percentage of members who are actively involved.●

SNIA Supported Solutions Forum Member Companies

Today, Supported Solutions Forum membership includes 34 companies in storage-related businesses. To understand more about these member companies and why they participate in the SSF, we asked the following questions:

- What types of products is your company interested in seeing in SSF-approved solutions?
- Why do you see the SSF as a unique opportunity?
- What is your goal in participating in the SSF?

Adaptec
www.adaptec.com
SSF contact: Bill Lynn
(bill_lynn@adaptec.com)

Adaptec provides storage access solutions that reliably move, manage and protect critical data. Adaptec's solutions are found in networks, servers, workstations and desktops sold through OEMs and distribution channels. Adaptec's goal in working with the SSF is to drive new solutions, including iSCSI, that meet customer needs and are mutually supported by vendors.

ADIC
www.adic.com
SSF contact: Kevin Honeycutt
(kevin.honeycutt@adic.com)

As a leader in open systems storage networking libraries, data management software and storage networking appliances, ADIC supports the goals of the SSF. The formalized, heterogeneous so-

lutions will demonstrate the ability of ADIC Intelligent Storage solutions to store, manage and protect an organization's most valuable digital assets.

AT&T Managed Services and Hosting
www.business.att.com
SSF contact: Andrea Chiaffitelli
(chiaffitelli@att.com)

As a network provider, solutions integrator and managed services provider, AT&T delivers multi-vendor networked solutions. AT&T's commitment is to deliver excellent services to customers; as such, the interoperability of multi-vendor networked solutions necessitates that vendors work cooperatively for the benefit of our customers.

BMC Software
www.bmc.com
SSF contact: Tim Leite
(tim_leite@bmc.com)

BMC Software's PATROL Storage Management (PSM) offers a solution for a flexible and interoperable storage environment and helps customers manage their businesses and improve ROI from their storage environments. The SSF provides an opportunity for customers to evaluate PSM in an enterprise storage setting.

Brocade Communications Systems
www.brocade.com
SSF contact: Tony Di Cenzo
(tdicenzo@brocade.com)

Brocade Communications Systems is committed to the integration of its Silk-

Worm family of fabric switches and software in SSF Supported Solutions. Brocade fully supports SSF arrangements for cooperative support of customers with SSF solutions, which include fabrics based on Brocade products.

Chaparral Network Storage Inc.
www.chaparralnet.com
SSF contact: Bob Perera
(bperera@chaparralnet.com)

Chaparral Network Storage offers storage appliances that provide simple solutions to storage networking, including data routers, RAID controllers and disk array appliances. Our SSF participation allows the demonstration of storage networking appliances featuring SCSI and FC connectivity; easy configuration and management tools; and tested interoperability with leading SAN products and storage resource management software.

CNT
www.cnt.com
SSF contact: Gary Johnson
(gary_johnson@cnt.com)

As an expert in global storage networking solutions, CNT not only designs its technology to conform with existing and emerging standards, but also participates in guiding the creation of standards that ensure interoperability. CNT's commitment to the SSF will serve to extend its interoperability to a broader set of storage networking technologies.

CommVault Systems

www.commvault.com

SSF contact: Larry Cormier
(lcormier@commvault.com)

CommVault is committed to the SNIA vision of storage networks as trusted solutions. The SSF's emphasis on multi-vendor integration and cooperative support provides a fast-track approach to making that vision reality. CommVault's goal is to provide unified data protection, migration and availability solutions while simplifying the management of heterogeneous storage networks.

CreekPath Systems

www.creekpath.com

SSF contact: Scott Hansbury
(scott.hansbury@creekpath.com)

CreekPath Systems is fully committed to the SSF mission of working together (with the vendor community) to solve customers' interoperability problems. As the developer of a heterogeneous integrated storage management platform, CreekPath's participation in this forum is necessary and critical to provide customers a complete, closed-loop, heterogeneous solution.

Crossroads

www.crossroads.com

SSF contact: S.W. Worth
(sworth@crossroads.com)

Crossroads Systems, a leader in storage routing, is now shipping its fifth-generation product, the Crossroads 10000. Because Crossroads' products are also available from leading OEM vendors, Crossroads is a proponent of interoperability in heterogeneous environments such as those addressed by SSF Open SAN Supported Solutions.

DataCore Software

www.datacore.com

SSF contact: Ken Horner
(ken.horner@datacore.com)

DataCore's support for heterogeneous operating systems, multi-vendor storage and networking components in its SANsymphony software are part of its vision of interoperability through an open storage networking platform. DataCore is actively pursuing SSF-approved solutions that consolidate and automate storage management. SSF participation underscores our customer commitment.

Decru Inc.

www.decru.com

SSF contact: Brian Falkner
(bfalkner@decru.com)

Decru supports the integration of storage security into SSF solutions. The SSF adds value by introducing a level of multi-vendor testing and interoperability that has been unavailable to customers with SAN and NAS environments. Decru is committed to supporting interoperability for its vendor-independent storage security appliances within the SSF.

EMC

www.emc.com

SSF contact: Ron Lloyd
(lloyd_ron@emc.com)

As a leader in information storage systems, software, networks and services, EMC is an active member of the SSF. EMC firmly believes the SSF provides valuable services to customers by establishing a cooperative support community, and by establishing a means to develop, test and register jointly supported solutions.

Emulex Corp.

www.emulex.com

SSF contact: Clay Glenn
(clay.glenn@emulex.com)

Emulex is a leading supplier of storage networking host bus adapters (HBAs) based on Fibre Channel and IP networking technologies. As a member of the SSF, Emulex is constantly working with both OEM customers and partners to ensure open, fully tested and cooperatively supported heterogeneous SANs.

FalconStor Software Inc.

www.falconstor.com

SSF contact: Don Mead
(don.mead@falconstor.com)

FalconStor Software is committed to the SSF Open SAN Supported Solutions integration of its network storage infrastructure solutions for business continuity and centralized storage management. There's no doubt that the SSF allows FalconStor to be proactive in demonstrating IPStor's networking interoperability with multi-vendor storage networking solutions that have high value and solve real-world business problems.

Hewlett-Packard

www.hp.com

SSF contact: Warren Smith
(warren.smith@hp.com)

Hewlett-Packard develops storage solutions that encompass the entire spectrum of storage. HP's commitment to open, heterogeneous storage advancement is reflected in its active leadership in the SSF. The future of storage, in HP's vision, is in the development of open and adaptive storage infrastructures.

Hitachi Data Systems

www.hds.com

SSF contact: Don McNicoll
(don.mcnicoll@hds.com)

Hitachi Data Systems participates in the SSF vendor-neutral forum to enable the development, demonstration and joint multi-vendor support of heterogeneous SANs that address real-world business concerns. Hitachi Data Systems believes the SSF is proof positive that an open collaborative strategy is credible, viable and necessary in order to address the entire spectrum of SAN solutions.

IBM

www.ibm.com

SSF contact: Phil Mills
(millsp@us.ibm.com)

IBM believes in promoting interoperability in storage networking, and has been very active in the leadership of the SSF. IBM has participated in all SSF registered solutions to date, with disk and tape storage, backup/restore and database software. IBM is committed to working cooperatively with all vendors to ease customers' burdens in heterogeneous environments.

INRANGE Technologies

www.inrange.com

SSF contact: Mike Naylor
(mike.naylor@inrange.com)

INRANGE Technologies provides end-to-end enterprise connectivity solutions for moving, managing and protecting mission-critical data. We believe our involvement in the SSF enables the company to provide customers with proven, interoperable storage networking solutions to solve real-world customer and business requirements.

JNI Corp.

www.jni.com

SSF contact: Mark Woithe
(mwoithe@jni.com)

JNI is a leading manufacturer of connectivity products, including Fibre Channel HBAs and ASICs; high-availability storage networking software; and InfiniBand HCA Modules and related products. With JNI HBAs in Solaris-based SANs, Windows, Linux, HP-UX, AIX, Novell and Mac OS servers, JNI views the interoperability work of the SSF as extremely valuable.

LEGATO Systems Inc.

www.legato.com

SSF contact: Casey Byers
(cbyers@legato.com)

LEGATO recognizes the value of interoperable, standards-based solutions and is committed to the integration of its information protection, availability and management solutions via the SSF. LEGATO's goal for its SSF participation is to provide solutions that solve real-world business problems and deliver maximum customer value in performance and total cost of ownership.

LSI Logic Storage Systems

www.lsil.com

SSF contact: Joel McGill
(joel.mcgill@lsil.com)

LSI Logic supplies high-performance, scalable storage systems and technology, and multi-vendor storage management applications for the open enterprise. LSI Logic seeks to partner with others to provide comprehensive storage solutions. The SSF lets us document tested configurations to improve the customer experience of deploying consolidated storage solutions.

McDATA Corp.

www.mcdata.com

SSF contact: Mark Stratton
(mark.stratton@mcdata.com)

McDATA is a leader in open storage networking solutions and provides highly available, scalable and centrally managed SANs that address enterprise-wide storage problems. As an active member of the SSF, McDATA supports the effort to provide customers with open, supported SAN solutions.

MTI Technology

www.mti.com

SSF contact: Rich Ramos
(rich@chi.mti.com)

Leveraging its Storage Resource Management expertise, MTI is now focusing more on planning and consulting in implementations including interoperable products from other vendors — even competitors. MTI believes in neutrality, selecting best-of-breed products to integrate into clients' storage solutions. MTI embraces the SSF and the goals it shares with the pioneer storage products innovator.

Network Appliance

www.networkappliance.com

SSF contact: Paul Hansen
(paul.hansen@netapp.com)

Network Appliance is a leader in open network storage solutions for today's data-intensive enterprise, and is a pioneer in technology, product and partner firsts that continue to drive the evolution of storage. Through active participation from networked storage leaders, we are firmly convinced that the SSF will enable better interoperability, choice and total solutions for the business customer.

QLogic Corp.

www.qlogic.com

SSF contact: Barbara Craig
(barbara.craig@qlogic.com)

QLogic silicon, SANblade host bus adapters and SANbox switches power many of the world's leading SAN solutions. The SSF provides the industry and customers with an invaluable service by delivering proven, multi-vendor SAN recipes that system administrators can implement and support with confidence.

Quantum Corp.

www.quantum.com

SSF contact: Gary Jones
(gary.jones@quantum.com)

Quantum is firmly committed to providing multi-vendor tape storage for SAN solutions. To achieve this goal, we offer a broad choice of products that are cooperatively supported by participating vendors. Moreover, as an active member of the SSF, Quantum supports the industry's effort to develop cross-vendor, interoperable storage networking solutions that are registered and qualified by the SSF.

SpectraLogic

www.spectralogic.com

SSF contact: Sharon Isaacson
(sharoni@spectralogic.com)

SpectraLogic is a leading manufacturer of high-performance tape libraries providing mission-critical data protection for companies worldwide. Because its top priority is its customer, SpectraLogic's goal as an SSF member is to leverage the educational channel and peace of mind that the SSF offers through its qualification and awareness processes.

Storability Software

www.storability.eom

SSF contact: Ed Palmer
(ed.palmer@storability.eom)

Enterprises are challenged by the complexity of heterogeneous storage management. As a member of the SSF, Storability Software will focus on the integration of storage management software within multi-vendor SSF Open SAN solutions. The SSF provides a cooperative forum for Storability to demonstrate the interoperability of its storage management solution.

StorageTek

www.storagetek.com

SSF contact: Gavin Cole
(gavin_cole@storagetek.com)

StorageTek offers disk, tape, software and networking services and solutions. The SSF is a forum for engaging in real-world offerings that include integrated, tested and mutually supported products from StorageTek, its partners and its competitors. Through SSF participation, StorageTek commits to providing open, networked storage solutions that integrate into SSF-approved solutions.

Sun Microsystems

www.sun.com

SSF contact: Dona Stever
(dona.stever@sun.com)

As an active SNIA member, Sun Microsystems is committed to integrating and testing its complete line of storage networking and array systems, including the Sun StorEdge T3, 9960 and 6900, in SSF Open SAN Supported Solutions. Sun values SSF's unique cooperative customer support and participates in order to demonstrate heterogeneous storage support.

Troika Networks Inc.

www.troikanetworks.com

SSF contact: Peter Jones
(peterj@troikanetworks.com)

Troika Networks sees the SSF as a unique venue for the collaborative demonstration and support of storage networking solutions, and is working to integrate its new generation of storage services platforms into SSF solutions. Troika's goal within SSF is to demonstrate its intelligent solutions interoperating in supported configurations.

VERITAS Software

www.veritas.eom

SSF contact: Shawn Ray
(sray@veritas.com)

The extensive interoperability provided with the SSF Open SAN initiative demonstrates VERITAS Software's commitment to simplifying the management of multi-vendor SANs, supporting a wide range of operating environments, platforms and applications. Leveraging VERITAS's storage software products, these SSF solutions help customers implement a heterogeneous, best-of-breed solution for business-critical data.

XIOtech Corp., a Seagate Company

www.xiotech.com

SSF eontact: Robert Peglar
(robert_peglar@xiotech.com)

As a leader in virtualized open systems storage, XIOtech is interested in SSF solutions that involve standards-based components, from hosts to network infrastructure to storage. XIOtech firmly supports the mission of the SSF. XIOtech's goal in SSF participation is to promote whole-problem solutions to real networked storage problems.

The
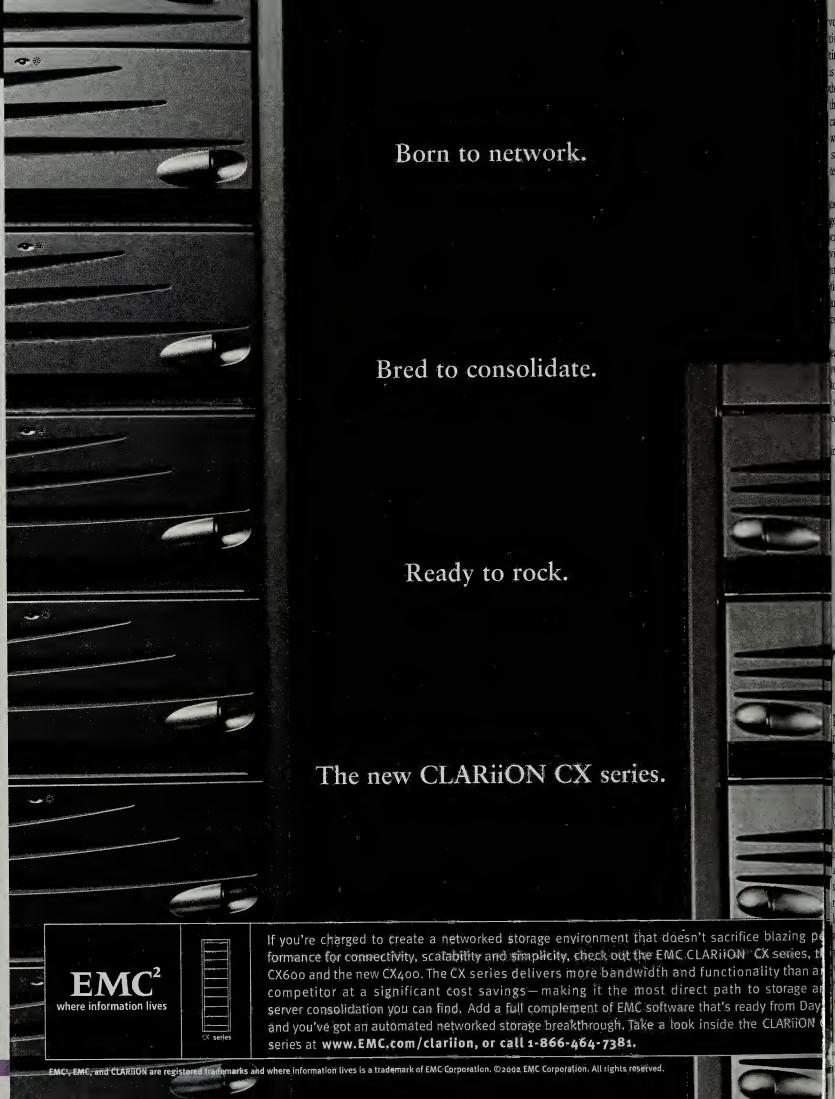
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ventory, shipping and invoicing functions makes sense. For individuals, time spent entering data into a system is cut and more IT power is placed in the hands of those who regularly use the application. Similarly, upgrades can be distributed and monitored, while quality assurance duties are assumed by the ASP vendor, freeing internal IT resources.

Companies with distributed operations (warehouses and sales reps) can get the benefits of a large-scale application without the cost of building a virtual private network or spending money to maintain disparate applications. Also, the time it takes to get up and running is usually far less than licensed implementations.

With tight budgets and ASP vendors eager to configure an application to your needs, you shouldn't feel the urge to hire a subcontractor to custom-build an integrated system for accounting, CRM and ERP.

It's still OK to have at least some faith in the Net. ▶

DAN GILLMOR
Debating A Fantasy Merger

THE TECHNOLOGY market remains in a deep swoon, which is a problem for pundits. We need news, doggone it, and trying to figure out what Web services are only gives us headaches. So let's imagine something more amusing. A merger of Sun Microsystems and Apple Computer, perhaps?

I grant that this would-be rumor isn't making the rounds, because as far as I know the companies aren't considering it. For every reason it might make sense, you can come up with at least one why it doesn't. So let's play what-if, and list a few whys and why-nots on each side. Please send your whys and why-nots, too, and I'll post the best ones on my Web page (www. dangillmor.com).

First, here are some whys:

■ The product line is more complementary than you might think at first glance. Sun is the foremost Unix server supplier on the planet and has been making tentative moves down toward the desktop. Apple, now the leading

supplier of desktop Unix with the release of Mac OS X, has been making moves into the low-end server space with its rack-mounted Xserve models.

■ Sun has some software that Apple needs, too. In particular, the StarOffice suite has become a reasonable Microsoft Office alternative everywhere but on the Mac, where Sun unaccountably has dropped the ball. The OpenOffice version of the application isn't ready for prime time and may never reach the level it should.

■ Sun's foray into desktop computing is tentative at best, relying on a Linux strategy. With OS X as the core of the desktop systems, the SunApple (AppleSun?) could offer an easy-to-use, easy-to-manage, soup-to-nuts line to businesses. A smarter blending of Java and Apple's user-centric notions would also be valuable in the emerg-

DAN GILLMOR is technology columnist at the *San Jose Mercury News.* Contact him at dgillmor@ sjmercury.com.

ing world of other intelligent devices, such as handhelds and powerful mobile phones.

■ Assuming Sun would buy Apple (appropriate, based on current market capitalizations), Steve Jobs could go back to running Pixar full-time, which looks like more fun, anyway.

■ A recent Merrill Lynch research report warned that Sun was in danger of becoming the Apple of the server market. I prefer to read that as an endorsement. And, of course, anything from a Wall Street analyst must be true, right?

Now here's why this merger would be nutty:

■ Apple is still a small part of the computer business, but it has an increasingly coherent product line. It's making steady headway in at least one place that counts: the digerati crowd that I see more and more carrying Mac

laptops and iPods to conferences and other industry events. At the same time, Sun's strategy is confusing. A merger would just add to the confusion.

■ Sun is trying to be more of a software company, with some success. But it botched the "write once, run anywhere" version of Java for the desktop, and its enterprise-heavy history doesn't augur well.

■ Then there's the ego question. Maybe Jobs would want to let go, but maybe not. Can you imagine Steve Jobs and Scott McNealy as co-CEOs? Me neither.

Note: In a recent *Computerworld* column, I made an indirect historical reference to the evils of the long-gone but not forgotten Nazi regime. A reader called me on this, saying it poisoned my argument. He was right. Apologies. ▶

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READERS' LETTERS

Simple Solution

THE WIDESPREAD unemployment of U.S. IT workers is a very serious problem affecting our economy. To date, the debate has focused on competition from foreign-born IT professionals working in the U.S. on H-1B visas, but the outsourcing of IT projects to overseas companies represents a more significant threat. The advice to U.S. IT professionals, proposed by a panel at Brainstorm Inc.'s Nearshore and Offshore Outsourcing conference, is simple – retool to save your job and let us undercut your wages [QuickLink 33217].

The simple solution is for our elected officials to suspend H-1B visa renewals and green card processing for IT professionals, permitting all H-1B visas to expire, reducing the excess supply of IT professionals in the U.S. and opening opportunities for more Americans. If this appears to be cruel, remember that H-1Bs were meant to attract IT workers because of a labor shortage. Now, immigration policy should catch up to reflect reduced demand for IT workers in the U.S.

Overseas competition is more difficult for our national policy-makers and corporate leaders to address. It requires that we re-examine America's economic, political and military role in the global economy. Free enterprise works only when the same rules apply to all participants. We are fast approaching the point where the negative aspects of unfair global competition are overcoming the benefits our population has gained from the recent global economic expansion.
Christopher A. Mauro
Montclair, N.J.

Blaming Vendors

THE RESULTS of the Nucleus Research survey give a snapshot of Siebel implementations in terms of degree of success, but they don't give any indication as to how these results came about [QuickLink 33196]. As a 10-year veteran of CRM and SFA projects, I can state with full confidence that such projects fail primarily because of the customer, not the vendor. Vendors can be faulted for a number of things, mainly overselling an unrealistic vision and underestimating the complexities of the organizational change needed to embrace their software. But it wouldn't be fair to lay the blame entirely at their feet. If customers carried out elementary due diligence precautions before launching CRM projects,

their chances of success would be much higher. And if this survey were carried out for SAP, Oracle or PeopleSoft, I'd be very surprised if the results were very different.
Michael Gentle
CRM consultant, Paris,
mgentle2@aol.com

Take the Initiative

PROGRAMMERS are constantly griping in publications such as yours about the current job market [Readers' Letters, QuickLink 33311]. I would agree that it's a really tough environment right now, yet at the same time, I find it rather ironic because I have so many friends and associates that spend very little time keeping their skills up to date. People forget that they're knowledge workers and are compensated accordingly. You can't take a class or two in Java or .Net and consider yourself trained in Internet development. How many people out there are being proactive and educating themselves now about Web services, Internet security or open-source technology, instead of waiting until they need a new job?
Dave Bigelow
IT strategist, Mitsubishi Motors, Fullerton, Calif.

Explaining TV

I REALLY ENJOYED the article on "MPEG Standards" [QuickLink 33314]. However, the information on interlacing in conventional TV is incorrect. Screens have two fields, odd and even, that alternate, or are interlaced. Each is drawn at the rate of 30 times per second. The net effect to the eye is to have a picture drawn 60 times per second, which masks perceptible video flicker (the human eye can perceive flicker at rates up to 48 times per second). But the whole picture (odd field plus even field) is drawn only 30 times per second.
Dale Kettring
Systems specialist, Washington
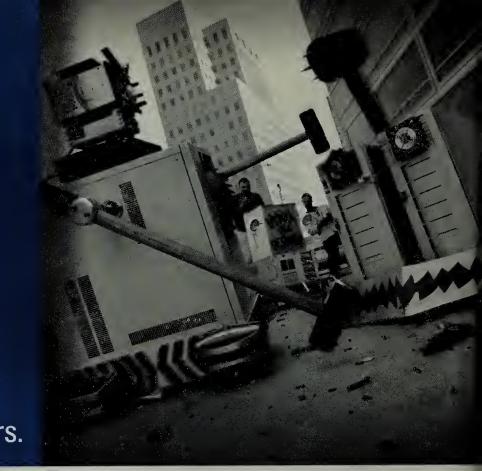
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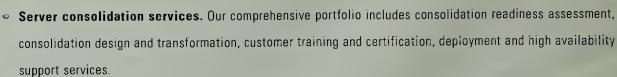
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TECHNOLOGY

KeyCorp's application-level monitoring infrastructure improved reliability, but extensive customization requirements have limited deployment to mission-critical apps. By Robert L. Mitchell

KEYCORP's IT team had its marching orders: to increase the financial services company's competitiveness by monitoring online banking and other customer-facing applications for problems — and address them before they could affect customers.

CASE STUDY

The central problem was customer service. "We were not even detecting problems before they were impacting the client," says Jim Russ, vice president of the company's enterprise management center.

With some 530,000 online banking and investing clients generating 14.5 million online transactions per month, the potential cost of downtime was substantial. Likewise, back-end system problems that affected teller productivity could indirectly affect KeyCorp's 3.8 million customers, who last year generated revenue of $84 billion for the Cleveland-based company.

When the project was initiated two years ago, KeyCorp wasn't motivated by an unusually large quantity of such problems, Russ says, but by a concern about the negative impression any problem might create with customers in a highly competitive banking market.

"[KeyCorp's] focus is a sign of the maturation that is increasingly occurring within IT shops today," says Cameron Height, an analyst at Stamford, Conn.-based Gartner Inc. "An application-centric approach gets us closer to understanding the potential business impact of failures within the supporting technology infrastructure."

With a wide range of systems scattered across bank branches and two data centers, KeyCorp faced a challenge. Success depended on creating a uniform monitoring infrastructure to support the systems and networks that sit underneath the applications. "If the infrastructure is down, the application isn't going to be available," Russ says.

KeyCorp would also need to develop a set of performance measures for each application. And it would need to establish a common monitoring console to aggregate all alerts, from the application level down, so that IT could correlate them to determine the root cause of each problem. Finally, scripts would be needed that could automatically respond to those alerts and correct the problems.

Consolidating Monitors

KeyCorp was using a wide range of monitoring tools that reported to 20 different management consoles in the enterprise management center. Russ began with an effort to create a single console. Chief Technology Officer Robert Rickert wanted a common reporting mechanism that all monitoring tools would use to feed data to that console, and the company ended up using the Simple Network Management Protocol (SNMP). Most of Key-

KeyCorp's Carolyn Gardner, Robert Rickert and Jim Russ say their application-monitoring infrastructure detects 60% to 70% of problems.

DANIEL LEVIN

Looking For Trouble

Corp's tools supported SNMP, Rickert says, and using it instead of many different proprietary mechanisms made passing information up the monitoring tool hierarchy easier.

Meanwhile, the application integration team was developing a list of seven key areas of application health that it wanted to monitor (see box at right). It then began a review of a half-dozen critical applications, including the online banking, deposit trust and investing systems, to determine the specific measurements each required.

"We tried to establish standard error messages and alerts for each of those categories," says Carolyn Gardner, assistant vice president and manager of enterprise application development. "We created all these alerts and worked with the enterprise management center to define the standard messages they would be seeing and what the resolution activity is."

KeyCorp also hoped to consolidate the many products it uses to monitor its IT infrastructure, which includes some 1,500 servers and IBM mainframes supporting more than 800 applications over local- and wide-area networks companywide. But that hasn't worked out. "We had a great burning desire to have a single tool or a small set of tools, and the harsh reality is that, even to this day, there are not good tools that cover wide chunks of the environment," Rickert says.

The bank did end up with a single console: Cisco Systems Inc.'s Cisco Info Center (CIC), which functions as a manager of managers, accepting SNMP-based alerts from more specialized monitoring tools and graphically representing and correlating events enterprisewide. IBM Tivoli Monitoring software acts as the intermediary for many server and application monitoring tools. It receives alerts from server-based agents and from tools like El Segundo, Calif.-based Candle Corp.'s IntelliWatch, which keeps tabs on KeyCorp's Lotus Domino e-mail servers (see diagram at right).

Getting at the Roots

But while tools such as IBM Tivoli Monitoring, Lucent Technologies Inc.'s VitalSuite, and IntelliWatch could detect catastrophic failures, they were limited in their ability to monitor all seven general areas of application health KeyCorp wanted to track. They were also unable to determine the root cause of application problems when, as often happened, multiple alarms were triggered, says Rickert. In some areas, KeyCorp made do. In others, program-

7 Critical Areas For Application Monitoring

APPLICATION AVAILABILITY: Is the application available for sign-on?

FILE AVAILABILITY: Are all critical files open and available to the application?

FUNCTION MONITORING: Are all critical functions within the application performing appropriately?

APPLICATION INTERFACES: Are the required connections, interfaces and APIs available?

DATA TRANSFER: Is the data sent and received what was expected?

DATA QUALITY: Is the data in critical files and fields valid, current and correct?

PERFORMANCE MONITORING: Is the application/transaction request responding within the level promised in the service-level agreement?

mers rolled up their sleeves to configure specific triggers and relay those to the appropriate monitoring tool.

"We went into the applications, and the developers defined what they wanted to detect and actually put calls into a common routine that could get that information passed out," says Russ. In the mainframe environment, KeyCorp created a middleware layer called KeyServer that interacts with many legacy mainframe applications to collect alerts and present them in a consistent way to CIC.

The first six applications in the initial project represented a sampling across all the IT architectures. It took six months to develop and deploy monitoring systems for them — a process that included many iterations of reviewing and refining alerts and scripting appropriate responses, Gardner says.

But using event correlation to determine the root cause of an application failure is still a challenge, Russ says, and it's an area where he would like to see the tools improve. In a simple example, a single circuit problem might generate a dozen or more alerts from

the circuit to the routers, servers and associated applications.

Despite those reservations, initial project results have been impressive, Rickert says. KeyCorp is now detecting 60% to 70% of problems associated with the six pilot applications, and it resolves one-third of those before users see a problem. Still, in some areas, elements of the lower-level monitoring infrastructure aren't yet complete, and KeyCorp is still working on monitoring for the rest of its first-tier applications.

Rickert would probably be the first to admit that getting to application-layer monitoring is a lot of work. He says he sees a payback in mission-critical applications, like online banking, that can't afford downtime, but adds, "I'm not sure it will ever make sense to have all 800 applications instrumented."

Rickert says there's a law of diminishing returns, even for critical applications, in terms of what should be monitored. "It's real easy for the engineers to go crazy and put a flag out for every damn thing and swamp people," he says. "That took a long time to sort out." ▶

KeyCorp's Application-Monitoring Architecture

Before extending performance monitoring into the application layer, KeyCorp first needed to build a solid systems management foundation for reporting on the underlying systems and network-level components. It established SNMP as the standard reporting mechanism to a common management console, which serves as the "monitor of monitors" and helps with event correlation to sort through multiple alarms and determine the root causes of problems.

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TECHNOLOGY

It's a Bird, It's a Blimp...

No, it's a StratSat, a high-altitude communications platform. By Bob Brewin

NASA's Helio Prototype aircraft, which SkyTower used to test its stratospheric satellite system, takes off from the Hawaiian island of Kauai.

THE HIGHER a radio antenna, the longer its range. That's why the tops of the highest buildings in any city bristle with a porcupinelike thatch of antennas.

But no matter how high the building, range is limited by obstructions such as hills, other buildings and the curvature of the earth.

Two aerospace companies believe they've found a way to build the ultimate antenna tower, one that will eliminate obstruction problems that plague terrestrial systems. Both hope to use high-altitude aircraft or airships to provide wide geographic coverage for cellular, wide-band data and high-definition television at a fraction of the cost of satellites and without the thousands of towers required to operate a cellular telephone system.

Communications satellites eliminate the obstruction problem by positioning antennas and transmitters 22,300 miles above the earth in a geostationary orbit. But satellites are expensive and difficult, if not impossible, to repair.

The two high-altitude communications platform companies — Advanced Technologies Group (ATG) in Bedford, England, and SkyTower Inc., a subsidiary of AeroVironment Inc. in Monrovia, Calif. — both plan to use advanced, high-tech aircraft they call "stratospheric satellites." The aircraft would operate at an altitude of 12 miles (65,000 feet) and provide multimegabit wireless data service and cellular telephone service over an area ranging from 30 to 300 miles. Wider areas could be covered by launching more aircraft.

The two companies have pursued dramatically different designs. ATG will base its "tower in the sky" on a lighter-than-air platform whose design heritage goes back to World War I. But Gordon Taylor, marketing director at ATG, which is headquartered in a dirigible hangar, emphasizes that there's little comparison between the company's StratSat (for stratospheric satellite) high-tech airship and the dirigibles and blimps of yore.

The StratSat uses helium for lift — not the flammable hydrogen that destroyed the *Hindenburg* zeppelin at Lakehurst, N.J., in 1937 — and solar energy to power its electric motors and communications gear. It also has an auxiliary diesel engine. Since the StratSat operates at such a high altitude, it avoids the high winds and storms that led to the crash of a U.S. Navy dirigible in 1925. On-board, dual Global Positioning System (GPS) units will help keep the StatSats "on-station" above specific service areas, Taylor adds.

ATG has years of experience building blimps, including Fuji's advertising blimp, and it pioneered such technologies as "fly-by-wire" fiber-optic control systems years before airplane manufacturers did, Taylor says. This experience is being applied to the design of the StratSat airship, which is about 650 ft. long (the length of three Boeing 747s).

The StratSat is designed to stay on-station for five years but can easily be brought down for repairs or upgrades to the communications payload — something almost impossible to do with a communications satellite.

ATG plans to lease the airship, or sell its services, to telecommunications companies such as cellular or wireless mobile data operators. ATG believes it can make a profit selling multimegabit data service at $5 a user per month, with the operators adding charges to their customers on top of that.

ATG plans to launch its first commercial StratSat within two to three years, and within five years, the company plans to have 150 to 225 in operation worldwide. ATG estimates it would take only 19 StratSats to cover the entire U.K. for third-generation (3G) high-speed data service, saving operators the costs of building and maintaining 10,000 cell towers.

SkyTower has based its stratospheric satellite on an innovative flying wing design with 14 solar-powered electric motors. The gossamer-wing craft uses composite materials including carbon fiber, epoxy Kevlar and plastic foam.

SkyTower tested its concept in July, beaming 3G and high-speed data signals from a 7-in. dish mounted on a NASA-funded aircraft 12 miles above the Hawaiian island of Kauai. Stuart Hindle, vice president of strategy and business development at SkyTower, says the tests proved the viability of using a stratospheric aircraft as a communications platform operating in a tight, circular orbit above a service area.
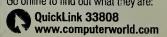
He says SkyTower expects to begin commercial service within two years, using production versions of the NASA test aircraft as the tower in the sky for advanced communications systems.

Weston Henderek, an analyst at ARS Inc. in La Jolla, Calif., describes the high-altitude communications platforms as a "pretty far-out concept."

But, he adds, they do have a value proposition in comparison with broadband satellite services such as those of Bellevue, Wash.-based Teledesic LLC. High costs keep delaying the launch date for those systems, which could provide the high-altitude platforms with a window of opportunity, Henderek says. ❯

NOT JUST TECHNOLOGY

ATG and SkyTower face regulatory hurdles as well. Go online to find out what they are:

◉ **QuickLink 33808**
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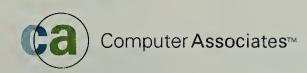
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P3P

The **Platform for Privacy Preferences (P3P)** is a voluntary protocol that sets standards for Web providers to publish their privacy policies and allows Web users to automatically match those policies to their privacy preferences.

BY JAN MATLIS

P3P, or the Platform for Privacy Preferences Project, is the World Wide Web Consortium's (W3C) answer to the problem of protecting personal data on the Web. It's a voluntary protocol for informing Web users of what they're getting into and setting a standard for Web providers to explain what they're planning to do with personal data.

P3P is supposed to ensure that a series of questions are answered about how personal information provided by Web users is handled. None of the policies are legally enforceable, however, nor is there a mechanism to ensure that organizations follow through. The onus is on consumers to reject Web sites that don't meet their guidelines. This has led critics to claim that P3P does little to protect users but does facilitate the collection of personal data by Web providers.

P3P began as an effort to establish a voluntary protocol with free, marketlike negotiation between Web users and Web providers. Users might have P3P-aware browsers or install P3P-aware applications, such as AT&T Corp.'s privacy bird (available for free download at *www.privacybird. com*.) Once the privacy bird has been configured, it search-es for machine-readable privacy policies at every Web site the user visits.

The privacy bird icon is green for Web sites that match the user's stated privacy guidelines, red for sites that don't match, yellow for those that don't provide P3P policies and green with a red exclamation point for sites that might match but have embedded images that have nonmatching or no privacy policies.

The idea is that users can accept or reject Web sites in an informed way and can examine what it is about offending Web sites that doesn't meet their standards. Before the Jan. 28, 2002, publication of P3P 1.0, proponents had thought that users might engage in negotiations with Web providers to reach mutually agreeable terms, but the protocols required to implement such transactions proved to be dauntingly complex.

On the provider side, P3P establishes a standard set of file formats, based on XML, that can be used to publish privacy policies. Tools such as P3PEdit, available at *www. policyeditor.com* for $70, can be used to create the appropriate files.

Few Web providers publish privacy policies. The list of such sites maintained at the P3P Web site (*www.w3.org/ P3P*) underlines the small number of P3P-compliant providers there is. If P3P doesn't catch on, Web surfers who embrace it may have to bend their own standards the majority of times they bring up new pages, until, as critics point out, they simply turn off the warning.

Two Main Issues

There are two categories of privacy issues that are addressed by P3P. One is the obvious request for information that Web users butt into when they complete commercial transactions on the Web, register for online services or enter sweepstakes. They may be asked for information such as their name, billing address and credit card number, along with additional information such as age, income level and preferred travel destinations.

E-commerce providers have found a worrisome number of Web users simply aborting transactions when faced with requests for personal data. The Web providers hope users will be persuaded to complete transactions if they know reasonable privacy policies are in place. Which is why many critics believe P3P is really a mechanism to grease the flow of personal data in the name of e-commerce.

"With P3P, we are enabling the development of a whole new class of Web tools and services that will help users protect their privacy while streamlining e-commerce transactions," Daniel J. Weitzner, the W3C technology and society domain leader, wrote on the P3P Web site

The other category of privacy issues addressed by P3P is that of cookies and Web beacons. Although cookies were originally envisioned by their Netscape developers as transient objects saving information on users' computers for single transactions, they have become more like permanent or semipermanent tags referring back to databases on the providers' computers. Cookies and Web beacons, which are unobtrusive, 1-pixel images that search for cookies on users' computers, cannot solicit information from users but can be used to track user Web behavior. Third-party banners and advertisements can install cookies and have beacons that read them.

Sophisticated users can establish cookie acceptance rules without P3P; firewalls can be used to control cookie behavior; and there are tools for disguising IP addresses. But for most users, the world of cookies and beacons is invisible and arcane, and P3P aims to address privacy concerns in this realm that might have led to more intrusive and legally binding standards such as those adopted by the Euro-pean Union's Data Directive.

P3P policies apply to the information gained through cookies as much as through overt data collection forms. The privacy bird will turn green or red depending on the cookie policy of the site that the user intends to visit.
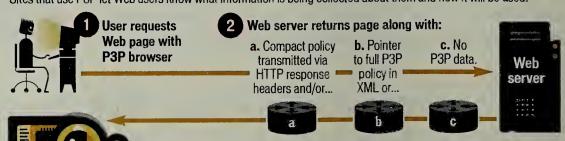
The European Union rejected P3P in January 1998 for establishing standards of privacy that were too low and for shifting the burden of enforcing privacy on Web users rather than on data controllers with legally binding rules. This means that the future of P3P and of the market in personal data remains unclear. ▶

Matlis is a freelance writer in Newton, Mass.

Looking for Answers

P3P is aimed at ensuring that users get answers to the following questions so they can make informed choices about whether they want to provide information to a Web site:

- What organization is collecting the information?
- What type of information is being collected?
- What will the information be used for?
- Will the user's information be shared with other organizations?
- Will the user be able to access his information and change how the information will be used?
- What method will be available for the user to resolve disputes with the organization?
- How will the organization maintain the information it collects?
- Where does the organization maintain publicly accessible in-depth information about its privacy policies?

SOURCE: NETSCAPE

QUICK STUDY

How P3P Works

Sites that use P3P let Web users know what information is being collected about them and how it will be used.

1 User requests Web page with P3P browser

2 Web server returns page along with:
- **a.** Compact policy transmitted via HTTP response headers and/or...
- **b.** Pointer to full P3P policy in XML or...
- **c.** No P3P data.

Web server

3 Browser compares response with user's privacy and cookie preferences, warning user or rejecting cookies if **P3P** policy is nonexistent or doesn't match user's set of privacy levels. Otherwise, page loads normally.

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Merger Blows Out Security Walls

Mathias starts over as acquisitions lay open carefully configured security perimeters.
By Mathias Thurman

I'M STILL CHASING down rogue wireless LAN access points (AP), but this week I've got bigger issues to deal with as my company integrates recent acquisitions into the IT infrastructure.

Before leaving the WLAN security saga, however, I should share one caveat I discovered: If you're using NetStumbler or a similar program to try to detect illegal wireless APs in your organization, understand that the MAC address you detect with these products is the *radio* address, not the LAN MAC address. Without the latter, it's difficult to trace rogue APs back to their source.

Merger Insecurities

My company grew from a few hundred employees to several thousand in a very short time — mainly through a series of mergers and acquisitions. We then had to quickly integrate these companies' IT infrastructures into ours.

Issues such as differences in the configurations and software have been a cause of great frustration during the integration process. It's scary when, due to a business decision, one is forced to configure a trusted relationship with an unknown entity.

Every time we absorb another company's infrastructure, methodologies and culture, we have to make a decision: Is it better to change its systems and ways of doing things to match ours, or to administer and manage its infrastructure per the company's established procedures?

That decision, in turn, affects the way the security infrastructure operates. For example, we have our intrusion-detection systems (IDS) tuned to monitor our existing network traffic based on a painstaking process of monitoring traffic and attributing suspicious activity to a valid incident or to normal network/application behavior. Tuning an IDS is a complicated and time-consuming process in itself. And just when we think we've got our IDS tuned to a state of quiescence, we go and set up a new circuit between our company and another acquisition.

After we establish a relationship between our network and that of the new company, we send an IDS sensor out to each new location. Then we end up starting almost from the beginning, figuring out what traffic is legitimate, marking it to prevent false positives, tracking down a new group of engineers and administrators to find out what's what, and tuning the IDS sensors appropriately.

SECURITY MANAGER'S JOURNAL

> ## It's scary when, due to a business decision, one is forced to configure a trusted relationship with an unknown entity.

Backup Measures

Until I feel more confident, we will augment our IDS deployment with Portland, Ore.-based Tripwire Inc.'s integrity-checking software. Tripwire is our option of last resort. If the IDS sensors fail to detect a compromise, Tripwire will pick up on it.

We're still thinking of deploying host-based intrusion-detection sensors on each of our critical servers, but in testing, the product we used required the Solaris Basic Security Module, which in turn shot our processor utilization to critical levels. I'm sure that it's been refined, and now there are other host-based IDS alternatives that we can consider when we have more time for an evaluation. But for now, we'll have to make do.

To add insult to injury, we've even had problems with the Tripwire software after installing it on several of our production systems. We have the software set to conduct a full integrity check from 2:00 a.m. to 3:00 a.m. each morning. I also have Tripwire configured to conduct a special check every 30 minutes on about 10 critical files where a change usually indicates a security breach. In doing so, I'm gambling that if someone compromises one of our systems, one of those 10 files (such as /etc/passwd and etc/default login/) will change.

Here's the problem: There are three variables associated with Unix file attributes that are important for both forensic activities and integrity-checking programs such as Tripwire: Atime, Mtime and Ctime, which tell when a file was last read, when its status last changed and when it was last modified, respectively. Tripwire uses these attributes to detect file tampering. By default, Tripwire conducts a series of file status checks and verifies the returned values against the initial snapshot taken during the database initialization phase.

The problem we ran into recently has to do with enterprise backups. By default, our backup software changes the Atime attribute as it backs up each file on the server. This is an issue because it's important that the file-access time is accurate at the time of backup. To remedy this, our backup software resets Atime on each backed-up file to what it was prior to the backup. But this changes the Ctime attribute, triggering a Tripwire alarm.

Our only remedy was to edit all of our policy files to remove the checking of the Ctime attribute on the files scheduled for backup. It's a bit of a kludge, but we made the changes, and our integrity checks are now running clean and quietly. It's a lot easier to tune Tripwire than it is an IDS. Then again, I'm not exactly comparing apples to apples.

But while these mergers and acquisitions have created security hassles, I expect it could have been worse: They could have been using WLANs. ▶

With all this going on, I'm uncomfortable trusting our IDS to detect every successful hack. We have continuing challenges with false positives, false negatives, event correlation, incident response, IDS tuning and proper placement of IDS sensors in the new infrastructure. And with new application-level attacks on the rise, I'm not sure we would detect an attack that penetrates into our critical infrastructure.

WHAT DO YOU THINK?

This week's journal is written by a real security manager, "Mathias Thurman," whose name and employer have been disguised for obvious reasons. Contact him at mathias_thurman@yahoo.com, or join the discussion in our forum:

QuickLink a1590

To find a complete archive of our Security Manager's Journals, go online to
◯ **computerworld.com/secjournal**

ROBERT L. SCHEIER

Mother of All Standards

WHAT DO SADDAM HUSSEIN and networked storage have in common? They're both the subject of intense negotiation and coalition building as competing parties try to find a

common approach to a big problem. With Saddam, the problem is neutralizing Iraq's weapons of mass destruction. With networked storage, the problem is getting devices of mass storage (pardon the poetic license) from different vendors to work together.

And just as with Saddam Hussein, there are two approaches to tackling storage interoperability. One is the "United Nations" approach, where leading members of the world community argue and try to agree on a common approach. In storage, that group is the Storage Networking Industry Association, and its equivalent of a UN Security Council resolution is the Storage Management Initiative Specification (SMIS), which is being rolled out this week in Orlando.

SMIS, formerly called Bluefin, is a common set of specifications that different vendors can use to allow their storage devices, and storage applications, to communicate with one another. It's designed to be totally open and usable by any vendor, and it has gathered support from virtually every significant storage player. Products that support SMIS should begin shipping this year, although it will take several years for the standard to mature.

But even while pledging allegiance to the SMIS UN approach, pairs of vendors are also taking the unilateral (or, to be fair, bilateral) approach of trading APIs and cross-licensing their

ROBERT L. SCHEIER is a freelance writer in Boylston, Mass. He can be reached at rscheier@charter.net.

technologies to ensure their products work together. Among the recent deal makers are Hewlett-Packard and Hitachi [QuickLink 32922], HP and IBM [QuickLink 32330], and HP and EMC [QuickLink 31448].

The bilateral approach solves the immediate interoperability problems more quickly than waiting for an industry group to agree on standards and for member companies to implement those standards. It also helps vendors to keep selling their proprietary products and support their existing customers while the standards efforts play out. But the bilateral deals help only customers of those particular vendors, keep those customers vulnerable to lock-in by those vendors and leave the really big interoperability problems for future generations to solve.

Just as in international politics, regional alliances and local wars complicate the picture. Four vendors — IBM, Hitachi, Sun and Veritas Software — this month teamed up to speed the production of SMIS-compliant products [QuickLink 33669]. This could be an attempt to isolate industry giant EMC, which is trying to draw support to its own WideSky storage middleware as an interoperability fix. Critics call WideSky proprietary, but EMC insists it's open and will work with SMIS — as one interoperability interface among many. EMC and Hi-

tachi would find it hard, meanwhile, to team up on their own API swap while they're mired in patent-infringement suits against each other.

Just as in international relations, there's a mix of idealism and calculated self-interest at work on all sides. To take the cynical view, no vendor would publicly reject "open standards," because that would imply it wants to lock in customers to its own products. But to give the vendors credit, developing and testing individual interfaces to one another's products can be an expensive waste of engineering time that could be better spent developing new, better products. Finally, and most strategically, most vendors realize that open standards create larger markets, which mean more opportunity for everyone.

Will peace, sweet reason and strict adherence to standards prevail among the vendors? Or will fragile attempts at compromise break down in misunderstanding and bickering, leaving our host bus adapters and storage-area network switches fighting for generations? It's too soon to tell. But while the diplomatic efforts continue, customers can keep up their "UN membership" by pressuring vendors to make their products SMIS-compliant as soon as possible. At the same time, customers must keep their powder dry by forcing vendors to guarantee the specific interoperability they need before signing the purchase contract.

Storage networking isn't exactly life-or-death, and there are no out-and-out villains like Saddam Hussein. But the same rules apply: Give diplomacy its best shot, but stay prepared to defend yourself. ▶

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> **You don't create a healthy organization in a single year. And if you only think about it once a year, you've missed the point."**
> - Margaret Schweer, director of human resources at IT Kraft Foods Inc.

LUCK
Of the Draw

Most of the 9,000-plus IT workers who took our survey told us they're faring surprisingly well salary-wise in the midst of the recession. But where they work makes all the difference. **By Kathleen Melymuka**

ORVIDAS

COMPUTERWORLD'S 16th Annual SALARY SURVEY

FOR THE PAST YEAR, Bank One Corp. in Chicago has been steeped in a massive project to consolidate disparate financial systems added through acquisitions. The bank has taken advantage of the flush market in IT workers to hire more than 1,000 people with expertise in networking, telecommunications, data center operations, management, business analysis, Cobol and PCs, making technology one of the busiest areas of the company.

Quite the opposite is true at a major national insurance company in the Midwest. There, the picture could hardly be bleaker. "We're under a ton of expense pressure," says the vice president of IT, who asked not to be identified for fear of embarrassing his company. His budget is flat, and he's cutting back everywhere. There's no money for new hires, and, with management weeding out subpar performers, no one feels secure. "Going into 2002, we were somewhat optimistic," the vice president says. Not so today. "We're just trying to hold the line," he says.

The sharply contrasting experiences of the IT departments at these two companies sum up *Computerworld*'s 16th Annual Salary Survey quite well. Although IT professionals on average saw an increase in pay, the bottom line for workers is influenced today more by where they work than what they do.

Our 2002 survey of IT professionals shows more than half (59.7%) of the 9,138 respondents had an average 6% uptick in their salaries, although more than 70% of respondents were flatlined on bonuses. Conversely, the average increase in pay for U.S. workers was just 4% this year, according to the U.S. Department of Labor's Bureau of Labor Statistics.

A much smaller percentage of *Computerworld*'s survey-takers took pay cuts: 9.5% said their salaries dipped an average of 13.1%. Roughly 30% reported no change in their salaries.

The fact that the average raise was 6% surprises Kazim Isfahani, an analyst at

Biggest Uptick	
JOB TITLE	AVERAGE PAY INCREASE*
CIO/VP of IT	7.2%
Network administrator	7.1%
Network manager	6.9%

Hardest Hit	
JOB TITLE	AVERAGE PAY DECREASE*
Project manager	13.6%
IT director	12.9%
IT manager	12.8%

*OF THOSE RESPONDENTS WHO REPORTED INCREASES OR DECREASES

KEN ORVIDAS

Robert Frances Group Inc., a consulting firm in Westport, Conn. He speculates that workers delivering bottom-line results may be getting most of the money in the salary pool, while others are being let go or retrained.
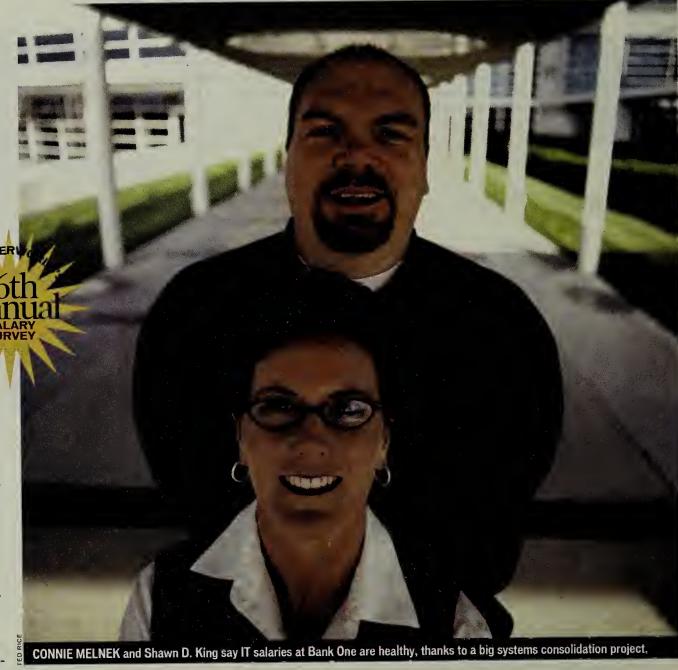
Isfahani says he expects no change in the salary picture during the next six months and adds that unlike 24 months ago, IT workers are staying put because of the economic uncertainty. But he suggests that CIOs think beyond that. "Once the economy improves, more [workers] will get up and leave, especially if they've been unhappy," he says. "And from an organizational perspective, companies have to think about what they need to do to make sure key jobs are backfilled."

One Step Forward, Two Back

This year's raises were modest in comparison with those of recent years and were rendered even more so by bonus cuts. Pay increases for the majority averaged 6%, but the 9.5% who took a cut in salary lost twice that much. Moreover, while 12% took home bigger bonuses this year, 18% received smaller ones.

Some companies are rolling bonus money into base pay to subsidize higher salaries, making the net effect of those 6% raises even less. Just over three-quarters of the information security managers who responded to our survey, for example, lost more than 40% of their bonus this year, but some of that might have gone into their above-average 8% salary hike. The good news is that while bonuses are generally given at a manager's discretion, making them easy targets when a budget needs to be trimmed, salary increases are less likely to be taken away once given.

In previous years, certain IT skills just about guaranteed the good life, particularly in high-flying industries. Not this year. For example, 11% of communications managers saw their bonuses grow while 27% watched them shrink. Nineteen percent of Inter-

CONNIE MELNEK and Shawn D. King say IT salaries at Bank One are healthy, thanks to a big systems consolidation project.

A Sampling of Total Compensation by Region

	NEW ENGLAND	MIDDLE ATLANTIC	SOUTH ATLANTIC	NORTH CENTRAL	SOUTH CENTRAL	MOUNTAIN	PACIFIC
CIO/vice president of IT	$176,481	$180,691	$152,496	$142,245	$136,693	$127,660	$153,671
Chief technology officer	$119,814	$171,639	$128,284	$108,933	$127,300	$178,463	$163,579
Director of IT/IS operations	$105,438	$106,179	$95,236	$100,599	$95,228	$83,051	$107,495
IT manager	$85,157	$84,080	$80,029	$78,415	$74,914	$76,497	$89,680
Applications development manager	$99,691	$94,056	$94,622	$83,991	$79,526	$87,869	$102,493
Project manager	$98,663	$100,160	$88,234	$83,795	$90,342	$92,109	$91,093
Database analyst/administrator	$76,175	$72,674	$73,650	$69,198	$67,017	$70,033	$80,369
Help desk/technical support specialist	$48,990	$48,919	$48,281	$42,134	$42,542	$47,995	$46,279
Technology/business analyst	$72,967	$71,176	$73,190	$64,757	$67,997	$72,045	$70,176
Network administrator	$55,015	$56,018	$51,607	$50,530	$48,862	$47,060	$56,510
Programmer/analyst	$61,525	$64,657	$65,853	$62,058	$61,137	$64,027	$68,444
Software engineer	$75,790	$75,017	$82,234	$74,005	$75,919	$74,872	$80,002
Systems administrator	$68,772	$64,412	$62,152	$60,332	$56,029	$57,963	$64,403
Systems programmer/analyst	$67,450	$70,695	$67,865	$65,262	$64,042	$69,198	$71,437

ALASKA

HAWAII

GOLD TEXT - Indicates the total base for this particular region and job title was fewer than 30 responses but more than 15. These figures should be used for comparison only because they don't constitute a statistically significant sampling.

net architects reported bonus gains averaging nearly 52%, but 21% reported bonus cuts of nearly 60%. These findings illustrate that when it comes to pay the company you work for may be more important than the job you do.

Keeping the Recession at Bay

The contrast in IT environments at three companies in the same region and same sector illustrates that point as well. At Bank One (*www.bankone.com*), IT's overriding goal, the systems consolidation, has pushed back the recession in the IT department. "For this and next year, our goals are very similar" because the project will continue full steam, says applications development manager Connie Melnek in the company's Columbus, Ohio, office.

Shawn D. King, a programmer/analyst working on Bank One's systems consolidation, has had a good year in every way in this environment. "If the company does well and you've contributed, you do better, too," he says. He's seen no belt-tightening in IT. In fact, there's an initiative to increase training this year.

Compensation packages currently include merit bonuses and stock options. Recruitment hasn't been as challenging as in the past, Melnek says. The bank has converted many contract workers to permanent status and has borrowed some talent from remote offices, in both cases saving on recruiting overhead. Salary ranges for IT skills continue to rise every year, she says, so staying within budget hasn't been a problem. And turnover has been low. "The economic situation plays into that," she says. "There aren't as many headhunters trying to recruit our folks."

King says he feels "very certain" that his job is at least as secure as last year. "We're very, very busy, and I'm involved in a lot of really important projects," he says. "As long as I keep getting these challenging projects to work on, I'm satisfied."

Bank One's project-based hiring is typical these days. "Companies are hiring only very specifically in areas like infrastructure, e-commerce infrastructure and Web development," says David Foote, president of Foote Partners LLC in New Canaan, Conn., and a *Computerworld* columnist. Because of the focus on projects, the highest skill premiums in the market are being paid to rapid application development/extreme programmers, he says.

But companies that aren't developing big projects can be tough places to work these days.

The insurance company vice president has had to cut back on training, travel and maintenance services. His budget is flat, but with life insurance sales down 28%, intense competition requires that his group continue to churn out products to make transactions quicker and easier for its sales channels. "We've got a full project plate through next year, but we're not staffing up for anything," he says. Instead, he's "trying to strike some balance" among competing needs of various projects, borrowing from some to staff others. Raises have been "pretty thin," he says. "A good raise here is 3%." Turnover of 8% includes "managing out [meaning firing] bad performers."

Struggling companies had better be careful which workers they "manage out," Foote warns. "Companies have laid off incredibly good people and are going to regret it. People are really disenchanted, and management has no idea how much morale has suffered," he says, adding that some of the most skilled IT people from all over the country have told him they plan to quit as soon as the economy turns.

HOT SKILL OR HOT AIR?

IT security jobs offer potential laced with uncertainty:

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Fighting Back

Household International Inc. (*www.household.com*) is using IT as a tool to overcome the tough economic environment. That makes the financial services company in Prospect Heights, Ill., a good place for an IT worker to be. "Technology is a strategic advantage for us," says Al Crook, group director for human resources. "It becomes all the more critical in times where there is more pressure to produce results because the climate and economy are more challenging."

The challenge is to roll out initiatives such as simplified online account access to woo credit card customers. Crook says he expects to see project activity and hiring continue to increase next year. He says the size and complexity of systems and networks at Household requires hiring workers "in almost every technology that exists" including wireless, satellite, mainframe, client/server, Unix, Sun, Lotus, PeopleSoft, Novell and all the major databases.

The downturn has enabled him to hire more economically, relying largely on his recruitment database rather than using agencies or ads. "Where it took us three to six months to find the right people in years before, now we find them on our database and hire them in three to six weeks," he says.

Despite all this activity, pay scales have been pretty flat. "In the past, no one would accept an offer for less than a 10% increase; now people are out of work or willing to come at lateral pay," he says. But more than 80% of IT workers at Household have some compensation beyond base salary, such as semiannual incentive programs with cash bonuses.

Turnover is a little more than 5%, and the lack of

Industry Outlook

Federal government	Computer services/consulting
81% of 278 respondents saw their salaries increase this year.	**13%** of 1,986 respondents saw their salaries decrease this year.
AVERAGE RAISE: **6.6%**	AVERAGE DECREASE: **13.9%**

Happy Campers

59.7% of respondents said that their compensation has increased from one year ago

49% said that they are satisfied with compensation, given base, bonuses and benefits in relation to job responsibilities

Perk Up

The most common types of bonuses received in the past year (among those employed part time or full time)

Performance	**34.1%**
Year-end/annual	**21.7%**
Profit-sharing	**18.3%**

Most Wanted Benefits

The top five benefits respondents would like their companies to offer:

Additional time off/sabbatical	**43%**
Telecommuting	**37.3%**
Comp time	**28.2%**
Company car	**19.7%**
Flexible scheduling	**19.4%**

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MANAGEMENT

SENIOR MANAGEMENT POSITIONS						MIDDLE MANAGEMENT POSITIONS			
CIO/vice president of IT	Chief technology officer	Chief security officer	Director of systems development	Director of IT/IS operations	Internet technology strategist	Computer operations manager	*Database manager	Help desk/technical support manager	*Information security manager
Average salary $122,950	Average salary $117,797	Average salary $90,267	Average salary $112,076	Average salary $90,417	Average salary $95,213	Average salary $72,124	Average salary $85,044	Average salary $68,256	Average salary $79,241
Bonus $28,328	Bonus $24,290	Bonus $10,711	Bonus $14,866	Bonus $10,169	Bonus $14,341	Bonus $4,675	Bonus $9,310	Bonus $6,191	Bonus $6,226
Total $151,278	Total $142,087	Total $100,978	Total $126,942	Total $100,586	Total $109,554	Total $76,799	Total $94,354	Total $74,447	Total $85,467

A Sampling of Average Total Compensation by Industry

CIO/vice president of IT	Chief technology officer	Chief security officer	Director of systems development	Director of IT/IS operations	Internet technology strategist	Computer operations manager	*Database manager	Help desk/technical support manager	*Information security manager
Business services $133,263	Computer services/consulting $147,033	Computer services/consulting $139,000	Computer reseller $133,501	Biotechnology $134,157	Computer services/consulting $108,318	Computer services/consulting $82,627	Computer services/consulting $116,186	Computer services/consulting $94,093	Business services $102,000
Computer services/consulting $151,105	Education $95,167	Energy $101,000	Computer services/consulting $132,713	Business services $105,484	Education $73,900	Education $69,714	Finance/real estate/insurance $106,750	Education $53,534	Computer services/consulting $78,845
Education $123,964	Finance/real estate/insurance $134,000	Finance/real estate/insurance $113,160	Finance/real estate/insurance $132,756	Computer services/consulting $120,381	Finance/real estate/insurance $111,171	Finance/real estate/insurance $101,714	Manufacturing (noncomputer) $91,354	Finance/real estate/insurance $71,750	Finance/real estate/insurance $97,922
Energy $143,259	Manufacturing (computer) $157,840	Health care $108,333	Health care $106,146	Education $73,338	Health care $92,700	Manufacturing (noncomputer) $73,302		Manufacturing (computer) $87,154	Government (federal) $85,879
Finance/real estate/insurance $165,719	Telecommunications $147,143		Manufacturing (computer) $130,167	Finance/real estate/insurance $117,446	Manufacturing (computer) $125,467			Manufacturing (noncomputer) $77,468	Health care $73,900
Government (state/local) $106,373				Government (state/local) $74,048	Telecommunications $114,100			Health care $73,400	Telecommunications $94,533
Health care $152,025				Health care $91,991				Telecommunications $76,914	
Manufacturing (noncomputer) $143,993				Manufacturing (noncomputer) $103,685					
Retail $187,500				Food/beverage $121,775					
				Manufacturing (computer) $106,700					
				Retail $119,573					

A Sampling of Average Total Compensation by Company Size (Ranked by Revenue)

CIO/vice president of IT	Chief technology officer	Chief security officer	Director of systems development	Director of IT/IS operations	Internet technology strategist	Computer operations manager	*Database manager	Help desk/technical support manager	*Information security manager
Less than $100M $123,058	Less than $100M $131,186	Less than $100M $87,523	Less than $100M $110,474	Less than $100M $83,658	Less than $100M $106,411	Less than $100M $67,596	Less than $100M $86,654	Less than $100M $62,030	Less than $100M $74,581
$100M to $999.9M $158,639	$100M to $999.9M $136,738	$100M to $999.9M $109,920	$100M to $999.9M $118,337	$100M to $999.9M $107,798	$100M to $999.9M $106,606	$100M to $999.9M $77,502	$100M to $999.9M $89,973	$100M to $999.9M $72,644	$100M to $999.9M $93,287
$1B to $9.9B $201,212	$1B to $9.9B $182,412	$1B to $9.9B $106,500	$1B to $9.9B $142,669	$1B to $9.9B $131,722	$1B to $9.9B $115,193	$1B to $9.9B $82,809	$1B to $9.9B $108,666	$1B to $9.9B $92,021	$1B to $9.9B $102,000
More than $10B $232,812		More than $10B $133,333	More than $10B $162,918	$10B or more $147,578	$10B or more $113,704	$10B or more $92,295	$10B or more $99,711		

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GOLD TEXT – Indicates the total base for this particular industry or region was fewer than 30 responses but more than 15 responses. These figures should be used for comparison only.

layoffs has been a morale booster, he says. "The minute you start [layoffs], the best people get a little skittish and start to take calls from headhunters," he says.

Looking ahead, Crook is guardedly optimistic about the IT environment in general, and he's already preparing his managers to face a tighter job market in the future. "We're making sure our managers will be good leaders in good times and bad," he says. "Ours are well tooled and schooled about how to lead, whether their people are getting zero offers from competitors or 15." ▶

Melymuka is a contributing writer in Duxbury, Mass. Contact her at kmelymuka@earthlink.net.

KEN ORVIDAS

Settled and Satisfied?

53.8% of respondents said they feel their current job is secure.

61.7% of respondents said they're satisfied overall with their current job.

71% of respondents said they aren't actively looking for another job.

Factors that would influence respondents to change jobs:

1. Pay increase
2. Access to new technology projects
3. Better balance of work and life
4. Large sign-on bonus
5. More training
6. More vacation time
7. More responsibility

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MANAGEMENT

MIDDLE MANAGEMENT POSITIONS					STAFF AND ENTRY-LEVEL POSITIONS				
IT/IS manager	Network manager	Product manager	Application development manager	Project manager	Database analyst/administrator	Help desk/technical support specialist	Information security specialist	Technology/business analyst	Network administrator
Average salary $73,621	Average salary $65,697	Average salary $85,302	Average salary $85,291	Average salary $81,981	Average salary $68,398	Average salary $43,737	Average salary $64,243	Average salary $62,626	Average salary $50,067
Bonus $6,298	Bonus $5,167	Bonus $8,430	Bonus $7,994	Bonus $6,624	Bonus $3,193	Bonus $1,551	Bonus $4,827	Bonus $4,611	Bonus $2,320
Total $79,919	Total $70,864	Total $93,732	Total $93,285	Total $88,605	Total $71,591	Total $45,288	Total $69,070	Total $67,237	Total $52,387

A Sampling of Average Total Compensation by Industry

IT/IS manager	Network manager	Product manager	Application development manager	Project manager	Database analyst/administrator	Help desk/technical support specialist	Information security specialist	Technology/business analyst	Network administrator
Business services $73,518	Computer services/consulting $94,731	Computer services/consulting $92,948	Computer services/consulting $104,152	Computer services/consulting $93,472	Computer services/consulting $75,978	Business services $47,452	Computer services/consulting $81,169	Computer services/consulting $72,471	Business services $47,430
Computer services/consulting $95,884	Education $59,469	Manufacturing (computer) $100,762	Finance/real estate/insurance $99,550	Energy/utility $104,583	Education $54,455	Computer services/consulting $46,991	Defense/aerospace $61,687	Finance/real estate/insurance $67,909	Computer services/consulting $53,481
Education $63,394	Finance/real estate/insurance $91,903	Manufacturing (noncomputer) $110,025	Health care $87,218	Finance/real estate/insurance $84,066	Finance/real estate/insurance $79,847	Education $37,185	Education $49,129	Health care $69,784	Education $47,535
Energy/utilities $85,633	Government (federal) $65,704		Manufacturing (noncomputer) $91,166	Government (state/local) $64,560	Government (state/local) $59,498	Finance/real estate/insurance $45,426	Energy $71,600	Manufacturing (noncomputer) $66,171	Finance/real estate/insurance $52,873
Finance/real estate/insurance $84,055	Government (state/local) $65,801		Telecommunications $112,657	Manufacturing (computer) $103,131	Manufacturing (noncomputer) $66,045	Government (state/local) $42,620	Finance/real estate/insurance $71,159	Telecommunications $54,193	Government (federal) $56,614
Government (state/local) $71,728	Health care $61,833			Manufacturing (noncomputer) $91,105	Health care $71,726	Health care $45,390	Government (federal) $65,940		Government (state/local) $48,030
Health care $78,187	Manufacturing (noncomputer) $67,901			Telecommunications $92,225	Telecommunications $74,527	Manufacturing (computer) $52,297			Health care $53,261
Manufacturing (noncomputer) $81,574						Manufacturing (noncomputer) $44,373			Manufacturing (computer) $59,687
Retail $80,920									Manufacturing (noncomputer) $50,586
Telecommunications $90,744									
Wholesale $72,895									

A Sampling of Average Total Compensation by Company Size (Ranked by Revenue)

IT/IS manager	Network manager	Product manager	Application development manager	Project manager	Database analyst/administrator	Help desk/technical support specialist	Information security specialist	Technology/business analyst	Network administrator
Less than $100M $67,201	Less than $100M $64,641	Less than $100M $90,822	Less than $100M $88,983	Less than $100M $84,236	Less than $100M $64,813	Less than $100M $40,901	Less than $100M $64,766	Less than $100M $68,627	Less than $100M $50,149
$100M to $999.9M $85,517	$100M to $999.9M $71,844	$100M to $999.9M $86,103	$100M to $999.9M $90,459	$100M to $999.9M $77,874	$100M to $999.9M $73,219	$100M to $999.9M $49,120		$100M to $999.9M $66,260	$100M to $999.9M $56,624
$1B to $9.9B $92,945	$1B to $9.9B $90,105		$1B to $9.9B $101,301	$1B to $9.9B $92,959	$1B to $9.9B $74,683	$1B to $9.9B $50,565	$1B to $9.9B $69,729	$1B to $9.9B $66,620	$1B to $9.9B $58,524
$10B or more $99,423		$10B or more $93,521	$10B or more $98,008	$10B or more $99,230	$10B or more $82,562		$10B or more $78,959	$10B or more $68,510	$10B or more $52,002

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A Sampling of Additional Job Titles

Communications manager*	E-commerce manager	Database architect	E-commerce specialist	Database developer/modeler	Network architect	Quality assurance specialist	Webmaster	Technical trainer
Average salary $69,306	Average salary $82,974	Average salary $79,900	Average salary $65,757	Average salary $67,140	Average salary $76,747	Average salary $63,320	Average salary $48,473	Average salary $54,976
Bonus $4,413	Bonus $10,297	Bonus $10,150	Bonus $5,521	Bonus $4,511	Bonus $5,538	Bonus $3,739	Bonus $3,575	Bonus $5,796
Total $73,719	Total $93,271	Total $90,050	Total $71,278	Total $71,651	Total $82,285	Total $67,059	Total $52,048	Total $60,772
BASE: 64 RESPONSES	BASE: 38 RESPONSES	BASE: 34 RESPONSES	BASE: 39 RESPONSES	BASE: 54 RESPONSES	BASE: 38 RESPONSES	BASE: 69 RESPONSES	BASE: 74 RESPONSES	BASE: 53 RESPONSES

*(Voice, data, telecommunications)

[SPEED]

288

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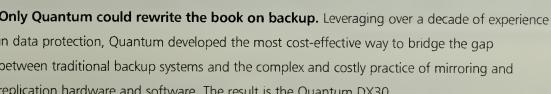
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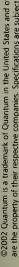
Only Quantum could rewrite the book on backup. Leveraging over a decade of experience in data protection, Quantum developed the most cost-effective way to bridge the gap between traditional backup systems and the complex and costly practice of mirroring and replication hardware and software. The result is the Quantum DX30.

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STAFF AND ENTRY-LEVEL POSITIONS

	Network engineer	Programmer/analyst	Project leader	Software developer	Software engineer	Systems administrator	Systems architect	Systems programmer	Technician	Web application developer
Average salary	$62,563	$59,947	$70,660	$65,036	$71,489	$58,454	$77,375	$63,331	$41,285	$54,723
Bonus	$4,054	$3,435	$5,893	$4,546	$4,241	$2,471	$7,282	$3,104	$2,143	$1,228
Total	$66,617	$63,382	$76,553	$69,582	$75,730	$60,925	$84,657	$66,435	$43,428	$55,951

A Sampling of Average Total Compensation by Industry

Network engineer
- Computer services/consulting $67,645
- Education $53,773
- Finance/real estate/insurance $75,554
- Government (state/local) $62,480
- Health care $56,241
- Manufacturing (noncomputer) $61,603
- Telecommunications $73,656

Programmer/analyst
- Business services $57,812
- Computer services/consulting $67,235
- Education $47,799
- Finance/real estate/insurance $66,850
- Government (state/local) $59,619
- Health care $57,076
- Manufacturing (noncomputer) $62,066
- Retail $73,342

Project leader
- Computer services/consulting $79,469
- Finance/real estate/insurance $78,651
- Government (state/local) $75,906
- Manufacturing (noncomputer) $72,446
- Telecommunications $74,913

Software developer
- Business services $64,709
- Computer services/consulting $72,404
- Education $53,759
- Finance/real estate/insurance $66,702
- Health care $54,600
- Manufacturing (noncomputer) $57,800
- Mining/construction $72,000

Software engineer
- Computer services/consulting $74,048
- Defense/aerospace $86,322
- Energy $61,000
- Finance/real estate/insurance $73,372
- Health care $80,014
- Manufacturing (computer) $80,024
- Manufacturing (noncomputer) $68,123
- Telecommunications $76,961

Systems administrator
- Computer services/consulting $64,395
- Education $47,567
- Finance/real estate/insurance $64,276
- Government (state/local) $56,202
- Health care $56,060
- Manufacturing (noncomputer) $56,495
- Retail $63,590
- Telecommunications $66,235

Systems architect
- Computer services/consulting $83,255
- Education $77,116
- Finance/real estate/insurance $84,978
- Manufacturing (computer) $100,519
- Manufacturing (noncomputer) $78,657
- Telecommunications $69,654

Systems programmer
- Computer services/consulting $66,367
- Education $53,791
- Finance/real estate/insurance $71,284
- Government (state/local) $60,906
- Health care $67,475
- Manufacturing (noncomputer) $64,347
- Retail $69,643
- Telecommunications $62,661

Technician
- Business services $40,769
- Computer services/consulting $46,396
- Education $29,644
- Finance/real estate/insurance $47,677
- Manufacturing (computer) $40,545
- Manufacturing (noncomputer) $44,853
- Telecommunications $44,311

Web application developer
- Computer services/consulting $52,203
- Education $44,534
- Finance/real estate/insurance $59,197
- Manufacturing (computer) $66,668
- Manufacturing (noncomputer) $62,709

A Sampling of Average Total Compensation by Company Size (Ranked by Revenue)

Revenue	Network engineer	Programmer/analyst	Project leader	Software developer	Software engineer	Systems administrator	Systems architect	Systems programmer	Technician	Web application developer
Less than $100M	$58,946	$59,960	$74,986	$63,316	$67,996	$55,997	$79,696	$61,312	$34,703	$51,986
$100M to $999.9M	$68,041	$62,036	$75,729	$70,650	$79,635	$62,967	$80,174	$65,853	$45,032	$60,633
$1B to $9.9B	$70,511	$69,197	$77,421	$79,342	$80,131	$65,004	$84,968	$70,287	$61,177	$61,525
$10B or more	$83,799	$69,655	$81,949	$76,605	$78,439	$70,626	$94,888	$71,286	$47,735	$64,650

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Methodology

Computerworld's 16th Annual Salary Survey was administered via the Internet. Both Computerworld print subscribers and visitors to Computerworld.com were included in the survey.

The collection of survey data began June 10 and was concluded July 8. A total of 10,407 individuals responded to the survey. Of these respondents, 9,138 were employed part- or full-time and were eligible to complete the entire survey. At the 95% confidence level, the margin of error for this sample size is plus/minus 1.02 percentage points.
— Mari Keefe, research manager

For a detailed look at how we conducted this survey, please visit our Web site:
www.computerworld.com
QuickLink 33476

WHO THEY ARE

THE MAJORITY OF RESPONDENTS are men (82.6%), employed full time with an average of 13 years in the IT field. The average age of respondents is 39, and almost 70% have advanced degrees. Forty-three percent indicated that they have some level of certification. The greatest number (19.1%) hail from the South Atlantic states. The average respondent's workweek is 46.1 hours.

The largest percentage of respondents indicated that they work in the computer services/consulting industry (21.7%). They have been in their current positions at their current companies an average of five years. Forty-three percent of our respondents indicated that they are in management, while 56.7% indicated that they hold staff or technical positions.

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Bench Strength

How and why to develop an IT succession plan. By Kathleen Melymuka

MOST LARGE COMPANIES don't have succession plans, and even those that do don't plan as deeply through levels of staff as they should. "Companies focus on hiring processes, getting people, ratcheting up and down," says Jason Richardson, president of Cutting Edge Information Inc., a research firm in Durham, N.C., that studied succession plans in 42 companies, most in the Fortune 500. This focus is wrong, he adds. "If you're shifting people in and out without a plan, you won't maintain performance, and you won't get better."

Succession planning is even more important — and less common — in IT, where success hinges on a broad range of hard-to-find skills, from technical expertise to business and technical analysis abilities.

"This is a pipeline for our future," says Margaret Schweer, director of human resources for IT at Kraft Foods Inc. in Northfield, Ill. "It pervades everything we do: how I staff my organization, feedback, guidance, opportunities. It's everything."

After year-end reviews, Kraft begins the succession-planning cycle, which it calls "advancement planning," with management meetings covering junior to executive levels. At each level, managers examine selection processes, feedback, development plans and skills gaps and then select the likely candidates for advancement and determine appropriate development activities. The process builds upward, culminating in a snapshot of IT for the CIO.

The difference between companies that do IT succession planning, like Kraft, and those that don't is their understanding of its value. Preparing for long-term IT succession planning means sharpening a company's in-house skills portfolio by focusing on the career development of key employees. It buffers the IT group against the anticipated exodus of talent caused by baby boomers beginning to retire and workers searching for greener pastures as the economy improves. Succession planning can help integrate recruitment and retention efforts, career planning, development, forecasting and performance appraisal. A good plan

HOW TO

will highlight current and future skills gaps and tailor efforts that prepare people to fit those demands. It will point to key people you can't afford to lose and focus retention efforts on them, and it will help you craft performance appraisals to balance the needs of the company with those of the individual.

Because it's future-oriented, succession planning prepares a company for new markets, technologies and business strategies, as well as expansion, contraction and other contingencies. And it goes straight to the bottom line: "If you want the IT organization to do more with less, you have to make sure that execution continues uninterrupted," says Kazim Isfahani, an analyst at Robert Frances Group Inc., a human capital consulting firm in Westport, Conn.

IT succession planning looks at the whole organization, not just the top.

"It's not so much the level of the person; it's the criticality of the function to the business," explains Linda Pittenger, CEO of People3, a human resources consulting firm in Bridgewater, N.J. "Traditional succession planning looks at the CIO, but I say, 'Who's your DBA that you can't lose?' "

IT succession planning attempts to match business/IT strategy with the career aspirations of IT staff. It's an ongoing goal. "You're going to have a constant process, not a one-time deal," Pittenger says.

Succession planning also focuses on the future. As a result, changes in strategy must always be top of mind. For example, if three database administrators are handling your Oracle Financials, but an impending acquisition is going to add significant work in that area, you may need additional Oracle talent. Conversely, if an impending outsourcing will leave certain areas overstaffed, you can begin to plan for more efficient use of those people.

A Partnership

Ideally, succession planning is a partnership between human resources and IT. "The process — the *how* — should be owned by HR, but the work should be done by the IT leader in conjunction with HR," says Pittenger.

But the process has to be embraced throughout the organization. "Multiple levels of management have to own it," Schweer says. And the plan has to be integrated into IT daily. "If you're doing it right, everybody is involved," she explains. "We're all doing it at a lot of different levels, but we're all looking at similar things: What are we doing to develop talent? How is our depth? What will

we do next year to improve?"

Schweer says Kraft's proprietary software for performance management is the cornerstone for all related activities. "Whatever it is you call that kind of tool, that's the vehicle you use for starting the conversation," she says.
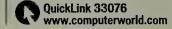
Pittenger adds that special software isn't necessary. "If you have good career development tools and a good skills inventory, you can do this on a spreadsheet," she says. The biggest challenge in IT succession planning seems to be getting it on the agenda. "A lot of companies don't do this at all; they live in a panic state," she says.

The other hurdle is agreeing that this isn't a one-shot exercise. "You don't create a healthy organization in a single year," Schweer says. "And if you only think about it once a year, you've missed the point." ▶

Melymuka is a Computerworld *contributing writer. Contact her at kmelymuka@earthlink.net.*

MICHAEL MORGENSTERN

SUCCESSION PLANNING

Do's and Don'ts

DO:
- Know the business/IT strategy
- Identify key roles in that strategy
- Consider how roles may change
- Decide on the skills to fill key roles
- Identify employees with certain skills, or those who have the potential to enhance their talent
- Identify candidates for critical jobs
- Tell them they're candidates for advancement, but don't name a specific job
- Integrate the process with other human resources initiatives, such as putting the most talented people on a fast track for career development

DON'T:
- Plan without reference to business/IT strategy
- Plan for only the top ranks
- Develop a plan as a one-time or annual exercise
- Expect HR or IT to do it alone

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ERIC GOLDFARB/PEER TO PEERS

Curiosity Skills The Company

I'VE ALWAYS VALUED CURIOSITY as a crucial element of a potential employee's skill set. Curiosity enhances a person's ability to learn and quickly overcome any and all obstacles to gaining new expertise. Potential employees with a high curiosity quotient impress me more than those who present imposing grade-point averages.

Next time you interview a candidate, ask this question: "Can you tell me how you go about fixing a problem for your company?" Be sensitive to how much — or how little — the candidate likes to research a problem. See if you can figure out from the response if the candidate is curious and action-oriented.

In these times of enormous business change, those of us in IT leadership positions need to build teams that continuously improve their skills, and I believe we can do so by encouraging curiosity. Two sobering statistics make our job challenging: Three-fourths of the population over the age of 25 don't have a college degree, yet 85% of jobs today require high-level skills, compared with 40% of jobs in the 1950s, according to reports released by the U.S. Bureau of Labor Statistics in 2001.

Obviously, the workforce needs more education in order to perform at a continuously rising level. Motivation is critical, and the key to motivation is curiosity. Our goal as leaders is to help provide that key. Creating the environment for continual improvement lies with the employer, while the responsibility to improve lies with the employee. Improvement can come from a book, training, a mentor, experience or finishing a college degree.

ERIC GOLDFARB is former IO at Global Knowledge, an independent provider of IT education solutions and certification programs in Cary, N.C.

Our organizations can't improve unless our people do. Without workers who keep up with developing technology, our companies can't grow better and stronger.

Every employee should assume responsibility for upgrading his skills, which in turn will boost job performance and the company's overall performance. I have always tried to build a culture of continuous learning by advocating formal mentoring and training programs. As business people, we expect productivity, response time, quality, expense control and customer service all to show steady gains over periods of time. So, too, should employee skills.

Here are five ways to make continuing education part of the culture of your organization:

1. Set the tone from the top. Praise front-line employees for learning something new — and learn something new yourself. Attend a training class with one of your subordinates. After the class, invite team members to breakfast to share what was learned.

2. Make learning ongoing and strategic. Meet regularly with IT team members to discuss what went right and wrong during the week. Listen to what they learned from successes and failures. The following week, take some of the lessons learned and sprinkle them into the IT process. Repeat! Learning involves more than a one-time program.

3. Measure learning. Track progress of the learning experience in regular job reviews, and discuss the results. A part of each team member's bonus should be tied to continual improvement metrics.

4. Stress the team nature of training as much as the individual results. A part of the bonus should be tied to the success of the IT team. So much of what we do today in IT is the result of the whole team. Everyone from the developers to the help desk can improve the value that IT brings to an organization, so rewards should encourage collaboration.

5. Recognize and celebrate learning together with your team. The next time your team hits its learning improvement objective, give everyone the afternoon off and go to a movie together. It's fun, they will remember it, and they will want to do it again.

The next year is likely to look a lot like 2002. IT budgets will continue to be tight, and the business environment will change in ways we can't anticipate. Companies will demand higher levels of accountability in what is left of their organizations. Companies that want to do more with less need a workforce that is held accountable for results and a workforce that can fix problems. Only well-trained and well-educated employees will have the necessary knowledge.

By gradually building your own competency and that of your teams, your organization's performance level will also improve. Show some curiosity, participate in the learning process and celebrate the results. ▶

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Don Tennant, News editor......................................(508) 620-7714
Craig Stedman, assistant News editor..........................(508) 820-8120
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Mitch Betts, director, Knowledge Centers.....................(301) 262-8243

REPORTERS

Bob Brewin, mobile computing/wireless; Intel PCs
and servers; health care..(301) 277-8069
Matt Hamblen, networking; network systems management;
e-commerce..(508) 820-8567
Thomas Hoffman, information economics;
IT investment issues; energy.......................................(845) 988-9630
Lucas Mearian, financial services; storage;
IT management..(508) 820-8215
Linda Rosencrance, general assignment;
transportation/carriers...(508) 628-4734
Carol Sliwa, Microsoft; Web services technologies;
application development; retail industry............................(508) 628-4731
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Patrick Thibodeau, state/federal government; antitrust;
legal issues; politics...(202) 333 2448
Dan Verton, security; defense and aerospace; travel........(703) 321-2277

Jaikumar Vijayan, enterprise systems; ASPs/outsourcing;
security; manufacturing...(630) 978-8390
Todd R. Weiss, general assignment; Linux;
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Patricia Keefe, editor at large..................................(508) 820-8183
Mark Hall, opinions editor.......................................(503) 391-1158
Frank Hayes, senior news columnist...........................(503) 252-0100

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Brian Sullivan, online editor at large..........................(508) 620-7780
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David Waugh, associate art director............................(508) 820-8142

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managing editor/production..(508) 820-8126
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Julie D'Errico, graphic designer
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John Klossner, cartoonist

ADMINISTRATIVE SUPPORT

Linda Gorgone, office manager...............................(508) 820-8176
Cheryl Dudek, administrative assistant.......................(508) 820-8178

CONTRIBUTING COLUMNISTS

John Berry, David Foote, Pimm Fox,
Michael Gartenberg, Dan Gillmor,
Thornton A. May, David Moschella,
Bart Perkins, Nicholas Petreley, Fran Quittel

CONTRIBUTING WRITERS

James Cope, Amy Helen Johnson,
Russell Kay, Sami Lais,
Kathleen Melymuka, Deborah Radcliff

COMPANIES IN THIS ISSUE

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NEWS

WorldCom Rolls Out Products, Seeks More Reorganization Time

WorldCom Inc. made a new-product pitch last week, even as the troubled carrier told a bankruptcy court that it would need five more months to put together a financial reorganization plan.

The product announcement atop the bankruptcy development "looks suspicious," said Bill Moore, president of the New York-based Communication Managers Association, a user group of 75 companies. "All the telcos' numbers are so bad that they are looking to get whatever publicity they can find anywhere."

WorldCom requested the five-month extension Oct. 22, saying it needs until April, instead of next month, to file a reorganization plan.

"Everybody wonders if WorldCom is even going to be there in six months," Moore said.

Les Kumagai, a spokesman for WorldCom, said it's common for companies in Chapter 11 bankruptcy proceedings to seek extensions, and customers shouldn't be concerned. "We are confident that our request will be granted," Kumagai said. He said the product announcements, along with the $1 billion in cash available to the company atop $1.1 billion in debtor possession financing, show that World-Com's "ongoing business is strong."

WorldCom announced World-Com Dedicated Analysis, an Internet access monitoring tool using technology from Visual Networks Inc. in Rockville, Md. It also announced a standards-based Internet access service, called WorldCom NxT1 Service, for providing bandwidth levels between those of T1 and T3 lines. The offering uses a customer premises router from Tasman Networks Inc. in San Jose.

Although Moore said the NxT1 of-fering is "potentially valuable" to users, he added that the fact the technology comes from other vendors is "a way for them to generate more revenue without much of a new product and not a lot of R&D."

But Kumagai said WorldCom is doing a lot of research and development despite the Chapter 11 filing in July. He declined to disclose the amount of WorldCom's R&D investment, however.

Steven Harris, an analyst at IDC in Framingham, Mass., said the announcements show that the company "is definitely thinking for the long term," and he urged customers to think of WorldCom products separately from its financial problems.

The Internet monitoring tool lets companies monitor service levels and dropped packets on the local loop – from a central office to the customer premises – which is something few carriers have done, Harris said. Carriers typically provide monitoring tools only for the network infrastructure, not the last few hundred yards of a connection to a company premise, he explained.

– Matt Hamblen

NEW PRODUCTS

WorldCom

DEDICATED ANALYSIS

■ Monitors all Internet dedicated circuits, such as T1, NxT1, T3, OCn and Ethernet

■ Applications include event monitoring, price reporting, traffic monitoring and reporting, and uptime analysis

Pricing: $70 per month for T1; up to $300 for OC48 lines

NXT1 SERVICE

■ For bandwidth needs of 1.5M (T1) to 45M bit/sec. (T3)

■ Enables use of two to eight T1 lines at a single location

Pricing: List price of $3,500 for a 2xT1; $9,700 for an 8xT1

Bankruptcies Could Trigger Price War

WASHINGTON

Pricing for telecommunications services faces an uncertain future. Major providers are worried that bankruptcy filings could leave some competitors debt-free and poised for new pricing wars. But industry consolidation could actually lead to higher prices.

If WorldCom comes out "of bankruptcy intact, they are going to be in a superior position to compete; they will have virtually no debt," said Brian Adamik, president and CEO of The Yankee Group in Boston. Meanwhile, companies that have operated ethically and within the law "are going to have a very difficult time competing effectively," he said.

Companies' use of bankruptcy laws to eliminate debt has clearly touched a nerve. Ivan Seidenberg, president and CEO of Verizon Communications, said he's angry.

"It really drives us crazy when we hear people will use bankruptcy as a way to cleanse themselves of all these sins and then turn around and drive pricing down," Seidenberg said at Yankee's telecom forum here last week. "Customers might think that [lower pricing] is a good thing for a very short period of time. But customers will get themselves in big trouble with companies who can't sustain services."

Sprint's top executive, Bill Esrey, lashed out at rival World-Com, saying its inflated earnings forced competitors to cut prices to show similarly strong results, with disastrous consequences. "You cannot overestimate the impact of WorldCom's malfeasance on the telecom industry," said Esrey, who said his firm and others were forced to match World-Com's pricing.
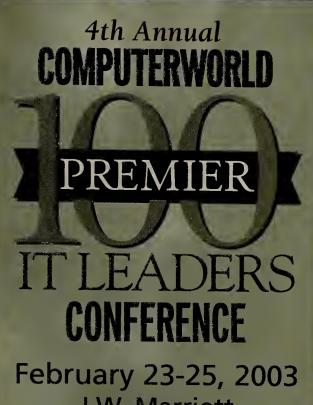
WorldCom declined to comment.

– Patrick Thibodeau

Telecom

ported third-quarter earnings of $207 million on $12 billion in revenue, representing a decline of 8.3% from a year ago, a bright spot was its IP-managed services, which grew about 7% in the quarter.

Other telecom providers are taking notice. Verizon Communications last week said it plans to spend billions on the corporate segment and will detail its plans Nov. 4.

Officials at Sprint Corp. last week outlined plans to deliver "total access solutions" that stress the ability to access corporate networks from any location and device.

It's an offering that's potentially attractive to Dean Larrabee, vice president of technical operations at Thomson Financial in New York. But he's looking for a lot more from telecom vendors than new products and services.

"It first has to come from somebody that I've been able to develop trust and rapport [with], that understands my business," he said.

Since the downturn, Larrabee said, the telecom companies he has dealt with have been more interested in ensuring that their offerings align with his business needs.

But users are being cautious, given that so many telecom service and equipment providers are facing financial problems. In the past two years, more than 60 such providers have filed for bankruptcy protection. Among them are World-Com Inc., Global Crossing Ltd., WilTel Communications Group Inc. and PSINet Inc.

H. Britton Choi, network operations and engineering manager at Washington-based law firm Hogan & Hartson LLP, said that about nine months ago he began demanding contract clauses that allow his firm to cancel service the day a telecom provider files for bankruptcy protection. And vendors aren't resisting those terms, he said.

"For us, the biggest thing that falters after bankruptcy is not so much that they are going to go out of business, but that their customer service suffers greatly because their best people usually leave," said Choi.

Corporate IT will indeed be important to the telecom industry's recovery, analysts and speakers said last week at a telecom forum here sponsored by The Yankee Group.

AT&T President David Dorman, who was named chairman and CEO-designate of the company in July, said AT&T's gains are coming from taking market share, rather than from market growth. And that "is not a sustainable proposition forever," he said at the forum.

"We need the economy and telecom industry to turn around and stimulate growth again," Dorman added. "We are doing relatively well, but we'd like to see telecom return to an 8%, 10% growth rate across the board." ▶

> " The biggest thing that falters after bankruptcy ... is that their customer service suffers greatly.
> **H. BRITTON CHOI,**
> Hogan & Hartson LLP

FRANK HAYES ■ FRANKLY SPEAKING

Expect the Worst

DIDJA NOTICE? Betcha didn't. Starting at 5 p.m. Eastern time last Monday afternoon, when the Internet's root servers were hit by what's been called the biggest denial-of-service attack in history, you probably didn't see any difference (see story, Page One). That's partly because roughly a third of the 13 servers that hand out information on domain names kept working through the data storm. But mostly it's because — let's face it — we don't expect much from the Internet.

And that's as it should be.

Contrary to folklore, the Internet was never designed to withstand nuclear attack. It was cobbled together from a bunch of existing networks that were reasonably reliable for their time — the early 1970s — but weren't really anything special when it came to security or robustness.

So, though it was a shock in 1988 when Cornell University graduate student Robert Morris released a worm that brought the then-much-smaller Internet to its knees, much of the amazement was that one guy could create such a mess that took so long to clean up.

Systems administrators back then knew that the Internet's systems weren't particularly secure, that hardware broke down and software was buggy and phone lines went flooey sometimes. Did e-mail get delayed? Did connections become impossible? OK, that happened all the time. When the Morris worm hit, it just happened a lot, all at once.

That was half the Internet's lifetime ago. Fourteen years later, the Internet has gotten much faster, bigger and more important to business. Web-based companies depend on it completely, but everyone else counts on getting e-mail and connecting with suppliers and serving customers through the Internet, too.

But who really *trusts* the Internet? Not those businesses, which shell out for redundant T1 lines in case the primaries go down, and for firewalls and monitoring software for when the bad guys come knocking.

Not service providers, which cache domain names and Web page contents to reduce traffic, speed up data delivery and dodge the effects of those annoying breakdowns.

And certainly not users, who have grown accustomed to Web sites that show up slowly or not at all, e-mail that vanishes for days and services that inexplicably crap out and then return.

We all *expect* that old, familiar "information superhighway" to run about as smoothly as a freeway at rush hour. So many things can go wrong, and regularly do, that we've already made adjustments for most of them — with redundancy and patience and, sometimes, a simple willingness to do without the Internet right now and try again later.

And that's the Internet's biggest advantage against attacks like the one on Monday. We treat it like a rickety system always on the verge of collapse. As much as we need it, we don't trust it to be fast or reliable or even to work at all — at least at any particular moment.

The result? Even a massive attack doesn't much bother us.

That's worth keeping in mind as IT budgets slowly loosen up and the opportunities for new Internet-based systems return.

We don't *want* to depend on the Internet. To use it, sure — but never to trust it. And as long as we don't take it for granted — as long as we keep piling on the redundant connections and backup systems — the Internet will continue to be a valuable tool for us.

Of course, that doesn't mean we don't need to keep working to build a more secure, robust Internet, from the root servers and the network backbones on down to Web browsers on PCs. We need to close holes, filter more effectively and monitor more closely.

Because there's one thing about the Internet we *can* take for granted: The bad guys will keep attacking, in more complicated and clever ways.

Maybe next time we'll even notice. ▶

FRANK HAYES, *Computerworld's* senior news columnist, has covered IT for more than 20 years. Contact him at frank_hayes@computerworld.com.

SHARK TANK

Well, That Explains It

Every morning between 8 and 9, there's a big increase in traffic on this U.S. company's WAN link to Europe. Sysadmin pilot fish sniffs out the problem: "An engineer visiting from the U.K. was Telnetting into his Unix workstation in England and browsing the Web from there," says fish. Engineer's explanation: "I wanted to use all my favorite bookmarks from home, and this was the easiest way to do it."

Doughnuts And Jam

This newly installed $20,000 networked color copier jams first thing every morning, but service tech pilot fish can't find a problem. So one morning he shows up at the customer site at 8 – to find the copier covered with doughnuts and the office manager leaning on the copy button, explaining, "We're warming them."

Who Needs It?

After a weekend of remodeling her own office, human resources manager is in a panic: She can't get on the network to access materials she needs for a meeting in an hour. IT pilot fish hotfoots it over to the office and quickly spots the network cable unplugged from the wall. "Oh, I never use that phone line," HR manager explains, "so I don't need it plugged in."

The Long Way

Back in the 1980s, 100 programmers are working remotely in a fast-growing area, linked to a data center by microwave dish. When their connection mysteriously begins going down a dozen times a day, pilot fish finally identifies the problem: A construction crane's arm is crossing the line-of-sight path between the dish and a microwave tower. "The crane operator couldn't understand why he was told to rotate his crane the long way around," sighs fish, "and couldn't take the shortest path, right through our microwave connection."

That Would Help

When a user complains that her color printer won't print yellow, help desk pilot fish is baffled: The ink cartridge is new, and the printer self-tests fine. Finally, user asks, "Would it make a difference if I used white paper?" What color paper are you using? fish asks. User: "Yellow."

Quiet, Please

Hospital's IT manager pilot fish gets Priority 1 call – there's a PC beeping incessantly, and a nervous secretary has already put in a call to the bomb squad. But by the time fish rushes over, it's too late. "The secretary's co-workers had already 'disarmed' her PC," fish says – by removing the stack of files sitting on her keyboard.

4 computer cluster with Linux